Advant® OCS
with Master software

Functional Units Part 5
GENCON GENBIN GENUSD

User’s Guide

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Chapter 1 Introduction

1.1 General

The function library available in an ABB Advant Controller 400 Series installation includes an extensive range of different data base elements and PC elements. A required control function can be built up with the AMPL language (ABB Master Programming Language).

Functional units are available to supplement the library for more complex functions. The functional unit is a “package” of different program functions (such as PC elements and data base elements).

Each functional unit has a specific communication module for connection to the Operator station (for control and supervision). The operators handling in the Operator Station has a function adapted dialog. Standardized display elements are used for visual indications.

The packaging simplifies documentation and implementation of, for example, functions with both control function and associated operators actions via display screen and keyboard. PC elements and functional units can be used freely together.

Applications include feedback control, sequence control and motor/valve controls.

The functional units are constituted of pre-prepared parts. These consist of different control functions or interfaces to a user designed control function and different operators, alarm and event handling functions.

The descriptions of the functional units for process signal connections, AI, AO, DI, DO include a certain hardware function to give a complete picture of the function. All other functional units are completely implemented in software.

NOTE

General knowledge of the Advant Controller 410/450 and Advant Station 500 Series Operator Station systems is required to fully understand the contents of this manual.

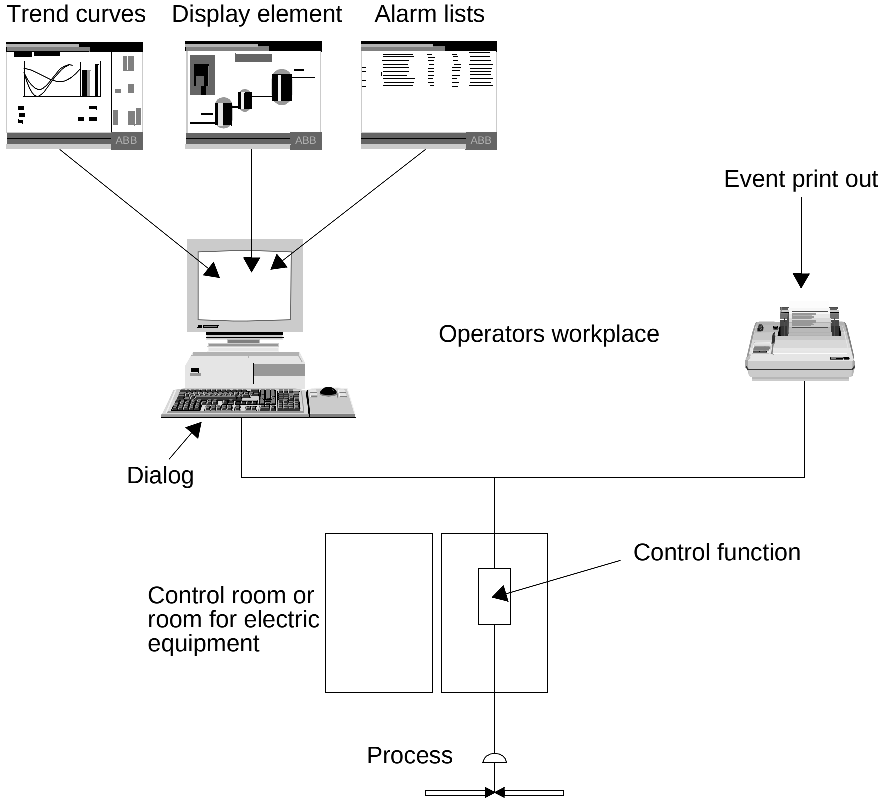


Figure 1-1. Software functions which can be included in a functional unit

1.2 Structure of the Manual

The manual, Functional Units, is for practical reasons divided into seven (7) physical parts. The contents of these seven parts are:

Part 1	Common Properties
Part 2	AI AO DI DO
Part 3	SEQ GROUP
Part 4	PIDCON RATIOSTN MANSTN
Part 5	GENCON GENBIN GENUSD
Part 6	MOTCON VALVECON
Part 7	PIDCONA

Functional Units Part 1 Common Properties, may be read first, in order to define the Functional Unit philosophy. This part also includes descriptions of common properties, valid for all Functional Units.

Part 2 to 7 do not have to be read in part number order. Each part stand by itself (together with part 1). A reader can start with Part 1 and then succeed with the part most urgent.

The contents of the different parts are:

Functional Units Part 1

- General descriptions of the functional units
- Descriptions of common system functions

Functional Units Part 2

- AI (Analog Input). The functional unit AI (Analog Input) incorporates functions for:
  - Scanning of analog and pulse train inputs from the process
  - Filtering, linearization and scaling of such inputs
  - Storage of such inputs or internally calculated analog variables
  - Update blocking and input simulation
  - Limit checking
  - Operator station functions
  - Internal and external alarm detection and handling.
- AO (Analog Output). The functional unit AO (Analog Output) incorporates functions for:
  - Output signal storage and updating
  - Auto and manual modes of control
  - Limit checking prior to storage
  - Scaling and output of an analog control signal to the process
  - Operator station functions.
- DI (Digital Input). The functional unit DI (Digital Input) incorporates functions for:
  - Scanning of digital process inputs.
  - Filtering and inversion of such inputs.
  - Storage of input data
  - Update blocking and input simulation
  - Operator station functions.

- DO (Digital Output). The functional unit DO (Digital Output) incorporates functions for:
  - Output signal storage and updating
  - Auto and Manual modes of control
  - Inversion of stored data prior to output
  - Output of a digital control signal to the process
  - Operator station functions.

Functional Units Part 3

- SEQ (Sequence).
  - SEQ (Sequence) is a software package - a functional unit - designed for universal use in sequence applications.
- GROUP (Group).
  - GROUP (Group) is used for group-start and group-stop of motors, valves and other binary objects coordinated as a group in the process. These objects are normally controlled by MOTCON or VALVECON with which GROUP is compatible.

Functional Units Part 4

- PIDCON
  - PIDCON has been developed for control functions in different processes. It is therefore called a process controller.
- RATIOSTN
  - RATIOSTN is mainly intended for ratio control. This ratio control is performed in cooperation with a process controller PIDCON or PIDCONA.
- MANSTN
  - MANSTN is intended for control of unregulated objects.

Functional Units Part 5

- GENCON
  - GENCON (GENeral object CONtroller) is a general tool which enables the user to create desired control functions. This Functional Unit include a User Defined PC Program.
- GENBIN
  - GENBIN (GENeral object BINary controller) is a general tool which enables the user to create desired control functions. This Functional Unit include a User Defined PC Program.
- GENUSD
  - GENUSD (GENeral object USer Defined controller) is a general tool which enables the user to create desired control functions. This Functional Unit include a User Defined PC Program.

Functional Units Part 6

- MOTCON
  - MOTCON is a functional unit designed for the control of motors in different processes.
- VALVECON
  - VALVECON is a functional unit designed for the control of 2-position valves in different processes.

Functional Units Part 7

- PIDCONA
  - PIDCONA is a complete PID control function with autotuning and adaptive control, including functions for operator interface and event handling.

1.3 Purpose of the Manual

The purpose of this manual is to give the Advant Controller 400 Series implementer information about the powerful library of predefined function units "packages", in order to provide all the information needed for the use of the different functional units.

Functional Units Part 1 contains the following information:

- General descriptions of the functional units
- Descriptions of common system functions

The other six parts include

- Detailed descriptions of the design and function of the different functional units
- Examples of applications

1.4 Other documentation

In addition to the unified documentation for the functional units offered by these series of Function Units Parts (part 1-7), there are other manuals which document individual types of program functions within a functional unit. There is, for example, a reference manual, *PC Elements Advant Controller 400 Series Reference Manual*, which embraces all of the PC elements included in the controller. The PC elements contained in any particular functional unit are also included in this. A corresponding manual is available for data base elements, *Data Base Elements Advant Controller 400 Series Reference Manual*. Both are valuable aids for practical use in the day-to-day design work, when knowledge of the function is available. Information in this manual is based on the following documents:

- *PC Elements Advant Controller 400 Series Reference Manual*
- *Data Base Elements Advant Controller 400 Series Reference Manual*
- *AdvaCommand Basic Functions User's Guide*
- *AdvaCommand User Interface Reference Manual*

Chapter 2 GENCON

2.1 General

The GENCON general regulator is included in a group of functional units which supplement the Advant Controller 410/450 function libraries and permit simplified implementation of process instrumentation functions.

Characteristic of these units is that their operationis adapted to standardized functions in the operator station.

GENCON, by virtue of its design, with a user-defined PC program, coupled via special PC elements to the operator functions of the functional unit, is suitable for use in both simpler and more sophisticated control operations.

Summarizing, the following functions and properties are of special importance:

- User defined control function
- Display and dialogs well adapted to control operations
- ON-OFF control capability.

2.2 Configuration

The GENCON general regulator consists of 4 parts:

1. A user defined PC program which solves the control algorithm. This program is an assembly of Advant Controller 410/450 PC elements.
2. Two PC elements which function as interfaces for logical signals between the PC program and the data base. These PC elements are handled in the same way as other PC elements in the Advant Controller 410/450 products.
3. A section for operator functions which consists of both presentation and dialog functions. Parameters and data from the process are presented on the display screen. A keyboard on which the operator can change e.g. output signal, set point and operation mode is used for the dialog. The results of the operator’s control actions are presented on the display screen. The application work for this part is limited, as standard, to display disposition.
4. A data base element with configuration constants and dynamic data which constitute an interface to the operator functions.

Figure 2-1 illustrates the relationship between these parts.

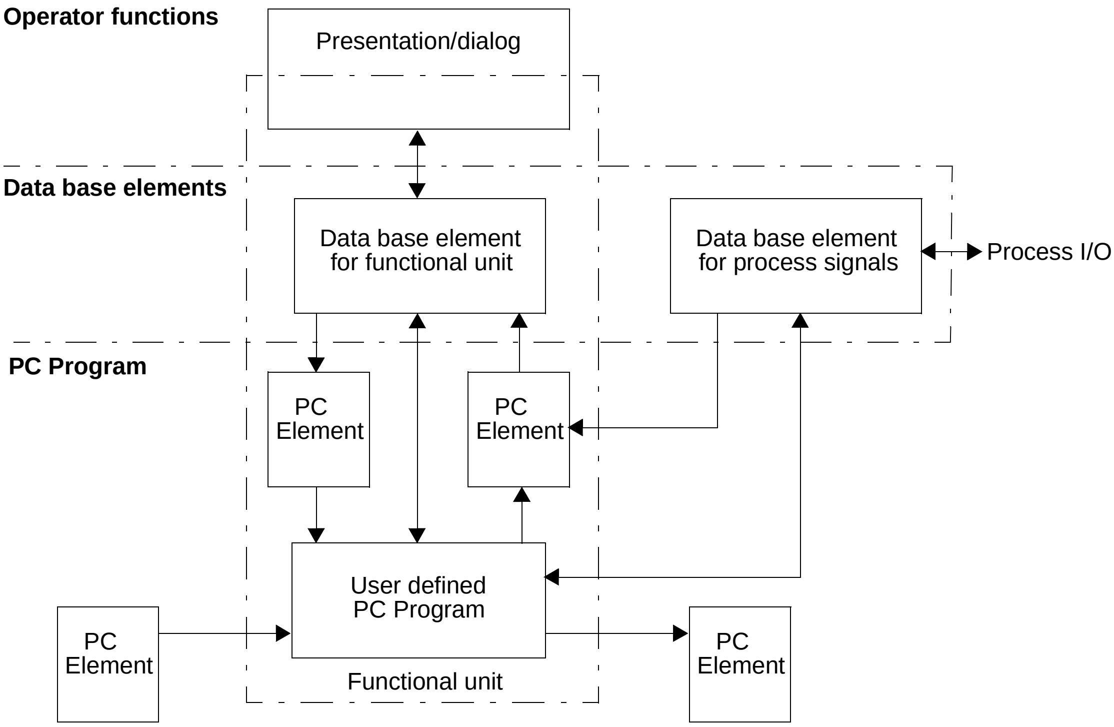


Figure 2-1. Functional unit, principle diagram

2.3 Function

Though GENCON is a general tool which enables the user to create desired control functions, it is not possible as it is for other functional units outside the GENXXX family, to give a control function orientated description. The possibilities given with GENCON are instead described with connection descriptions for PC elements and data base elements.

2.4 PC Elements

The PC elements GENCON-O (GENeral object CONtroller Order element) and GENCON-I (GENeral object CONtroller Indication element) are used as interfaces for logical signals between the user defined PC program and the data base element.

These data sheets are included in the manual *PC Elements Advant Controller 400 Series Reference Manual* in which all of the elements included in the Advant Controller 410/450 products are assembled.

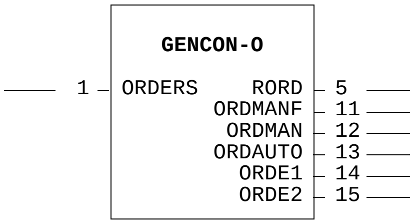
2.4.1 PC Element GENCON-O

Analog Functional Unit, Outputs GENCON-O

Summary

GENCON-O (**GEN**eral **CON**troller **- O**utputs) is used as an interface for binary signals between Advant Station 500 series OS and the user’s PC program via the data base element. The element forms part of the functional unit GENCON.

Call GENCON-O



PC element GENCON-O

Terminal Description

No	Name	Type	Description
1	ORDERS	IIL	Connection to ORDERS on the data base element for reading the values at the order outputs.
5	RORD	OI	**R**eset **ORD**er. Connection to RORD on the data base element to obtain pulsed outputs.
11	ORDMANF	OB	**ORD**er output **MAN**ual **F**orced mode. Ordering of manual forced control.
12	ORDMAN	OB	**ORD**er output **MAN**ual mode. Ordering of manual operation.
13	ORDAUTO	OB	**ORD**er output **AUTO** mode. Ordering of automatic operation.
14	ORDE1	OB	**ORD**er output **AUTO** mode. Ordering of automatic operation.
15	ORDE2	OB	**ORD**er output **E2** mode. Ordering of operation mode E2.

2.4.1.1 Outputs to PC Program

The Boolean terminals are order outputs. These terminals are connected to other PC elements in the user defined PC program to permit the transmission of orders from the dialog to the PC. The terminals adapt the values in ORDERS in the data base element. If more than one bit in ORDERS is one, only the output on the element with the highest priority is set to 1. The priority of the outputs is represented by the order in which they are listed on the PC element. Thus ORDMANF has the highest priority and ORDE2 the lowest.

2.4.1.2 Connections to Data Base Element

The input ORDERS is connected to ORDERS in the data base element. Values from the order section of the dialog are stored in ORDERS.

The element has one output, RORD, to the data base element. The output RORD (Reset ORDer) is used to determine if the order outputs are pulsed or static outputs. When RORD is connected to the data base element, one output is cleared immediately after it has been set, this resulting in pulsed outputs. If RORD is not connected to the data base element, the outputs are not automatically cleared. It is not possible to have an output or a group of outputs as pulsed outputs and the others as static.

Please observe that the terminal RORD **must** be connected to the data base element. Also observe that the PC program writes and reads **real values** in the data base element directly.

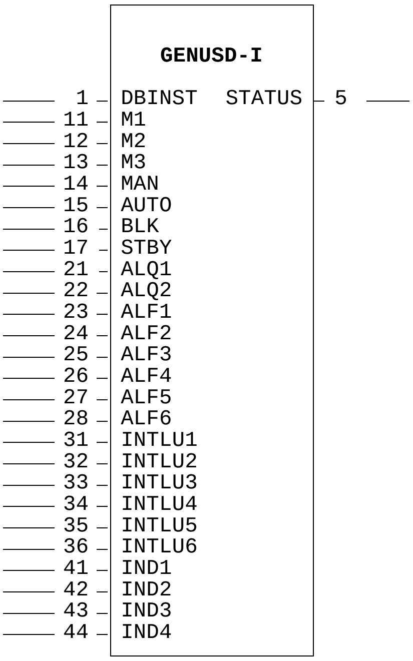
2.4.2 PC Element GENCON-I

Analog Functional Unit, Inputs   GENCON-I

Summary

GENUSD-I (**GEN**eral **US**er **D**efined functional unit **- I**nputs) is used as an interface for binary signals between the user's PC program and the Advant Station 500 series OS via data base element. The element forms part of the functional unit GENUSD.

Call - GENUSD-I



PC element GENUSD-I

Terminal Description

No	Name	Type	Description
1	DBINST	II	**D**ata **B**ase **INST**ance. An operational parameter or a constant, defining the instance number of the data base element (to be defined in its header). Alternatively, a connection to the data base element.
5	STATUS	OIL	Connection to STATUS on the data base element for writing the values at the indication inputs.
11	M1	IB	Operator position indication **M1**. Indication of operator position M1.
12	M2	IB	Operator position indication **M2**. Indication of operator position M2.
13	M3	IB	Operator position indication **M3**. Indication of operator position M3.
14	MAN	IB	Operation mode indication **MAN**ual. Indication of manual operation.
15	AUTO	IB	Operation mode indication **AUTO**. Indication of automatic operation.
16	BLK	IB	Operation mode indication **BL**oc**K**ed. Indication of blocking.

Terminal Description

No	Name	Type	Description
17	STBY	IB	Operation mode indication **ST**and **BY**. Indication of standby.
21	ALQ1	IB	**AL**arm indication **Q1**. Alarm indication, signal fault 1.
22	ALQ2	IB	**AL**arm indication **Q2**. Alarm indication, signal fault 2.
23	ALF1	IB	**AL**arm indication **F1**. Alarm indication, fault 1.
24	ALF2	IB	**AL**arm indication **F2**. Alarm indication, fault 2.
25	ALF3	IB	**AL**arm indication **F3**. Alarm indication, fault 3.
26	ALF4	IB	**AL**arm indication **F4**. Alarm indication, fault 4.
27	ALF5	IB	**AL**arm indication **F5**. Alarm indication, fault 5.
28	ALF6	IB	**AL**arm indication **F6**. Alarm indication, fault 6.
31	INTLU1	IB	**INT**er**L**ock indication **U1**. Indication of interlock U1.
32	INTLU2	IB	**INT**er**L**ock indication **U2**. Indication of interlock U2.
33	INTLU3	IB	**INT**er**L**ock indication **U3**. Indication of interlock U3.
35	INTLU5	IB	**INT**er**L**ock indication **U5**. Indication of interlock U5.
34	INTLU4	IB	**INT**er**L**ock indication **U4**. Indication of interlock U4.
36	INTLU6	IB	**INT**er**L**ock indication **U6**. Indication of interlock U6.
41	IND1	IB	**IND**ication **1**
42	IND2	IB	**IND**ication **2**
43	IND3	IB	**IND**ication **3**
44	IND4	IB	**IND**ication **4**

2.4.2.1 Inputs from PC Program

The Boolean terminals are indication inputs. These terminals can be connected to other PC elements in the user defined PC program. A change in one or several indications are designated an event. An event is reported to the operator station for any event printout necessary and for presentation in displays.

2.4.2.2 Connections to Data Base Element

The terminal DBINST is connected to the data base element. DBINST holds information about the instance number of the data base element.

The element has one output, STATUS, to the data base element. The output STATUS is connected to STATUS in the data base element. The indications are sent, in STATUS, up to the data base element for further presentation in the operator station.

Please observe that the PC program writes and reads **real values** in the data base element directly.

2.5 Data Base Element GENCON

Information about the data base element in the functional unit GENCON is given in data sheet form. This data sheet is included in the manual *Data Base Elements Advant Controller 400 Series Reference Manual* in which all of the data base elements included in the Advant Controller 410/450 products are assembled.

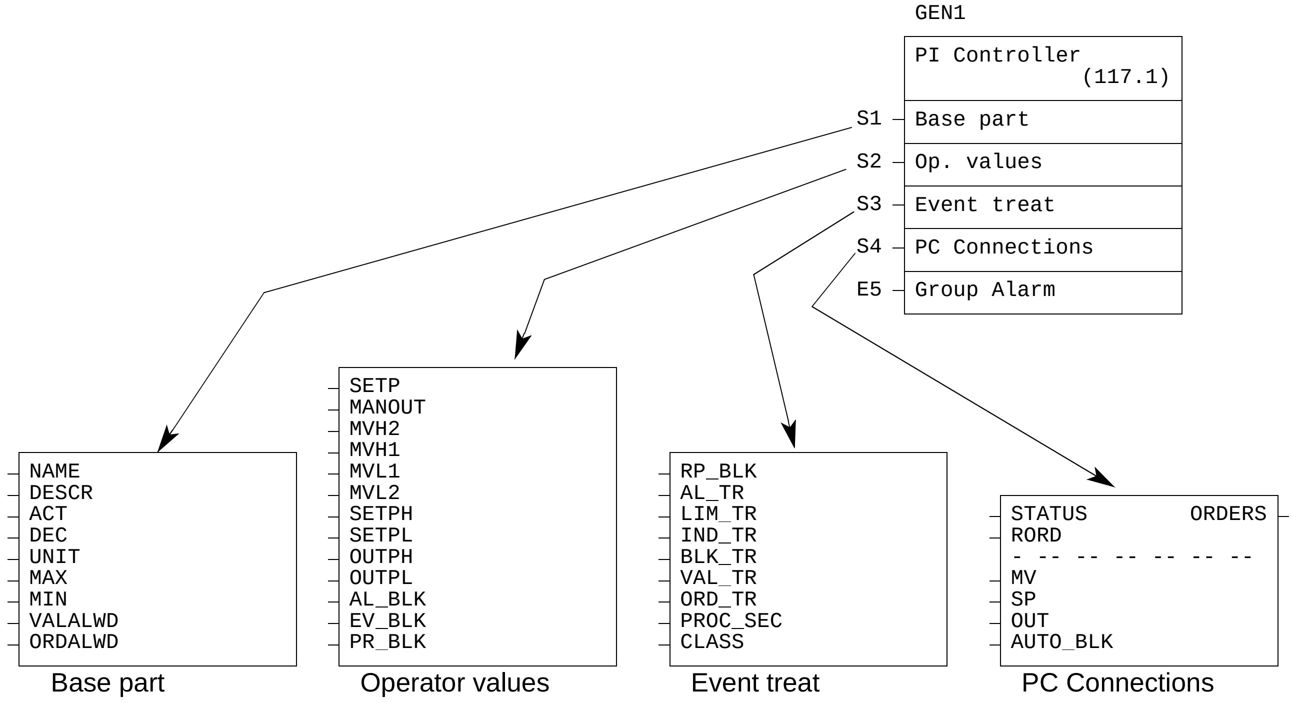
PI Controller GENCON

Summary

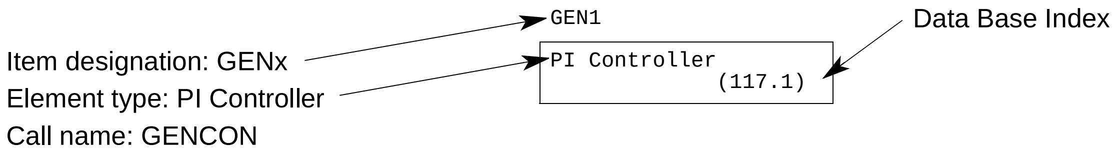
The PI Controller data base element is used to build up Advant Station 500 Series Operator Station functions for the GENCON functional unit. Some static information in the displays are given. Parameters which can be changed from dialog can be given start values. The element performs an interface between the PC-program/process function and Advant Station 500 Series Operator Station.

For information about the extension parts of Group Alarm see data base element Group Member.

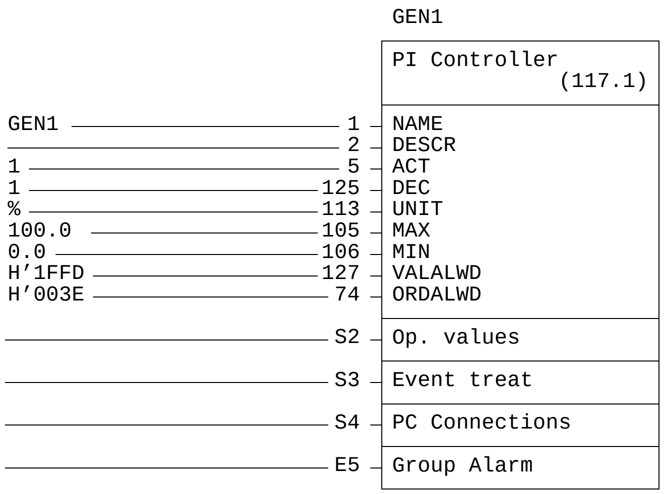
Overview



Head



Base part



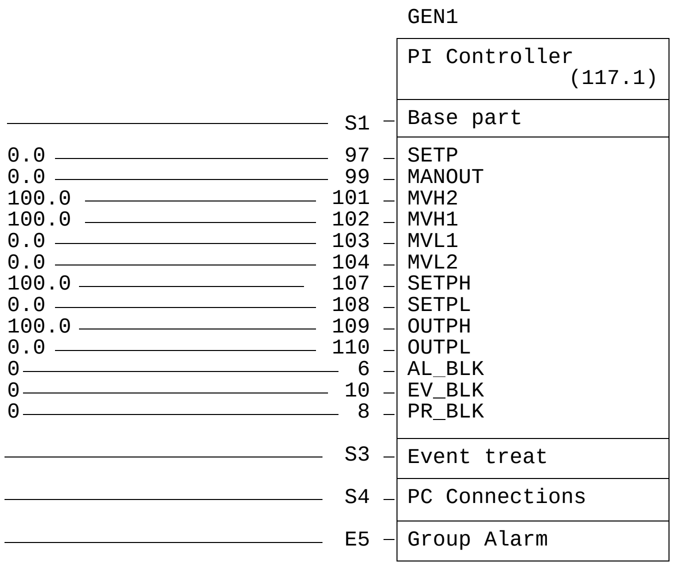
Terminal Description, Base part

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks
1	NAME	user	GENx	–	Every Controller must have a unique **NAME**. E.g. LICA 107.	Max. 20 characters. Spaces are not allowed.
2	DESCR	user	–	–	This **DESCR**iption of the Controller will be shown in Operator Station.	Max. 20 characters. You may enter any information regarding the controller.
5	ACT	user	1	B(r)	1=operator communication is **ACT**ive.	0=dialog is blocked and events are not updated.
125	DEC	user	1	–	The number of **DEC**imals for measured value and its alarm limits and for setpoint and autosetpoint and range min and range max.	A total number of 5 figures plus point and sign can be presented. 0..4 decimals.

Terminal Description, Base part (Continued)

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks		
113	UNIT	user	%	A6(r)	The **UNIT** of the measured value and setpoint in engineering unit.	Maximum 6 characters shown in Operator Station and data base element.		
105	MAX	user	100.0	R(r/w)	**MAX**imum value within measuring range.	Used for scaling of bar graph.		
106	MIN	user	0.0	R(r/w)	**MIN**imum value within measuring range.	Used for scaling of bar graph.		
127	VALALWD	user	H'1FFD	I(r/w)	**VAL**ue **AL**lo**W**e**D**. Group of data consisting of the values which are changable from the dialog. Each available value is represented by a flag in VALALWD. If it is allowed to change a value from the dialog its corresponding flag is set to 1. The default value gives the possibility to change all values that are available from the dialog. How VALALWD is calculated is shown in the table to the right.	Value	Bit value	Def. Hex. value
						SETP	1	D
						MANOUT	4	
						MVH2	8	
						MVH1	1	F
						MVL1	2	
						MVL2	4	
						MAX	8	
						MIN	1	F
						SETPH	2	
						SETPL	4	
						OUTPH	8	
						OUTPL	1	1
74	ORDALWD	user	H'003E	I(r/w)	**ORD**er **AL**lo**W**e**D**. Group of data consisting of the manual orders which are allowed to give from the dialog. Each available order is represented by a flag in ORDALWD. If it is allowed to give an order from the dialog, its correspon-ding flag is set to 1. The default value gives the possibility to give all orders that are available from the dialog. How ORDALWD is calculated is shown in the table to the right.	Manual order	Bit value	Def. Hex. value
						ORDMANF	2	E
						ORDMAN	4	
						ORDAUTO	8	
						ORDE1	1	3
						ORDE2	2	

Operators values



Terminal Description, Operators values (1)

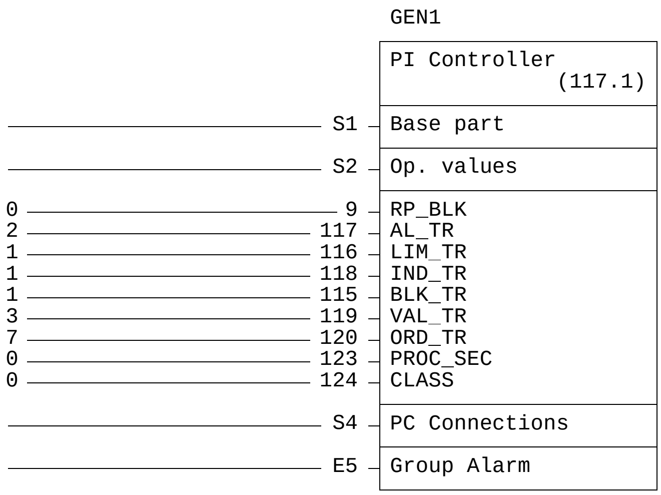
Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
97	SETP	dialog	0.0	R(r/w)	Auto **SETP**oint.	–
99	MANOUT	dialog	0.0	R(r/w)	**MAN**ual **OUT**put.	–
101	MVH2	dialog	100.0	R(r/w)	Alarm limit **H2** of **M**easured **V**alue.	–
102	MVH1	dialog	100.0	R(r/w)	Alarm limit **H1** of **M**easured **V**alue.	–
103	MVL1	dialog	0.0	R(r/w)	Alarm limit **L1** of **M**easured **V**alue.	–
104	MVL2	dialog	0.0	R(r/w)	Alarm limit **L2** of **M**easured **V**alue.	–
107	SETPH	dialog	100.0	R(r/w)	**H**igh limit of auto **SETP**oint.	–
108	SETPL	dialog	0.0	R(r/w)	**L**ow limit of auto **SETP**oint.	–
109	OUTPH	dialog	100.0	R(r/w)	**OUTP**ut **H**igh limit (%).	–
110	OUTPL	dialog	0.0	R(r/w)	**OUTP**ut **L**ow limit (%).	–
6	AL_BLK	dialog	0	B(r/w)	**BL**oc**K** **AL**arms and interlocks.	–
					1=event handling of alarms (Connection 21- 26 on GENCON-I) and limits (Connection 31- 34 on GENCON-I) is blocked.	

Terminal Description, Operators values (1) (Continued)

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks
10	EV_BLK	dialog	0	B(r/w)	**BL**oc**K** **EV**ents.	–
					1=event handling of common events (Connection 11- 16 and 41- 42 on GENCON-I) is blocked.	
8	PR_BLK	dialog	0	B(r/w)	**BL**oc**K** **PR**inter.	–

(1) The texts in the column “Description and “Remarks” are unique for this manual. They are not included in the manual *PC Elements Advant Controller 400 Series Reference Manual.*

Event treat



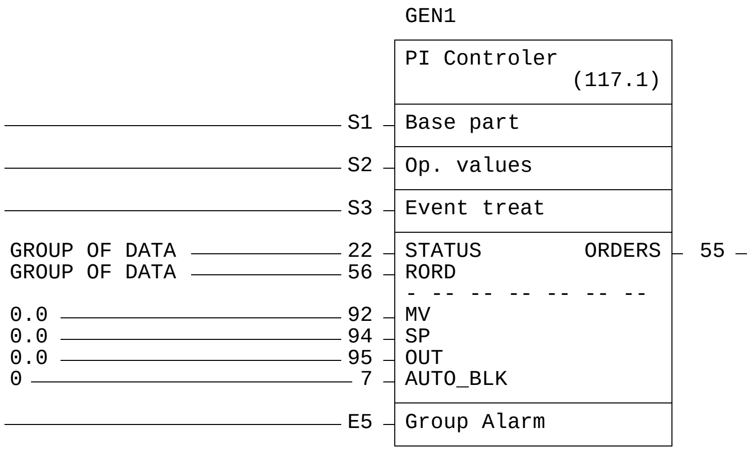
Terminal Description, Event treat

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks
9	RP_BLK	user	0	B(r/w)	**BL**oc**K** **R**e**P**eated alarms.	–
117	AL_TR	user	2	–	**AL**arm **TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of ALarms.	–
116	LIM_TR	user	1	–	**LIM**itation **TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of limitations.	–

Terminal Description, Event treat (Continued)

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
118	IND_TR	user	1	–	**IND**ication **TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of indications.	–
115	BLK_TR	user	1	–	**BL**oc**K TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of blockings.	The function is not yet implemented in Operator Station.
119	VAL_TR	user	3	–	**VAL**ue **TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of numerical values from dialog.	The function is not yet implemented in Operator Station.
120	ORD_TR	user	7	–	**ORD**er **TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of manual orders.	The function is not yet implemented in Operator Station.
123	PROC_SEC	user	0	I(r/w)	**PROC**ess **SEC**tion is used for sectioning the alarm handling. Section numbers 1-16.	0=no sectioning. The signal may be presented in lists –1=the signal cannot be selected and cannot be presented in lists.
124	CLASS	user	0	I(r/w)	**CLASS** subdivides process section. Used by status list function in Operator Station.	–

PC Connections



Terminal Description, PC Connections

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
22	STATUS	PC	–	IL(r/w)	Group of data to be connected to the PC element, GENBIN-I, connection **STATUS**.	–
55	ORDERS	dialog	–	IL(r/w)	Group of data to be connected to the PC element, GENBIN-O, connection **ORDERS**.	–
56	RORD	PC	–	I(r/w)	Group of data to be connected to the PC element, GENBIN-O, connection **RORD**.	–
92	MV	PC	0.0	R(r/w)	**M**easured **V**alue.	–
94	SP	PC	0.0	R(r/w)	Working **S**et**P**oint.	–
95	OUT	PC	0.0	R(r/w)	**OUT**put.	–
7	AUTO_BLK	PC	0	B(r/w)	**AUTO BL**oc**K** alarms and interlocks.	–

2.5.1 Presentation

Display elements that can be used for different display types are available for use in the functional unit GENCON.

The display elements show the status and the controls of the process with different degrees of detail and is intended for the following displays:

- Object display
- Group display
- Object closeup display
- Process display

Examples of different display elements which could be used in these displays are given in the following section. A complete list of the prepared elements available is provided in the manual *AdvaCommand User Interface Reference Manual*.

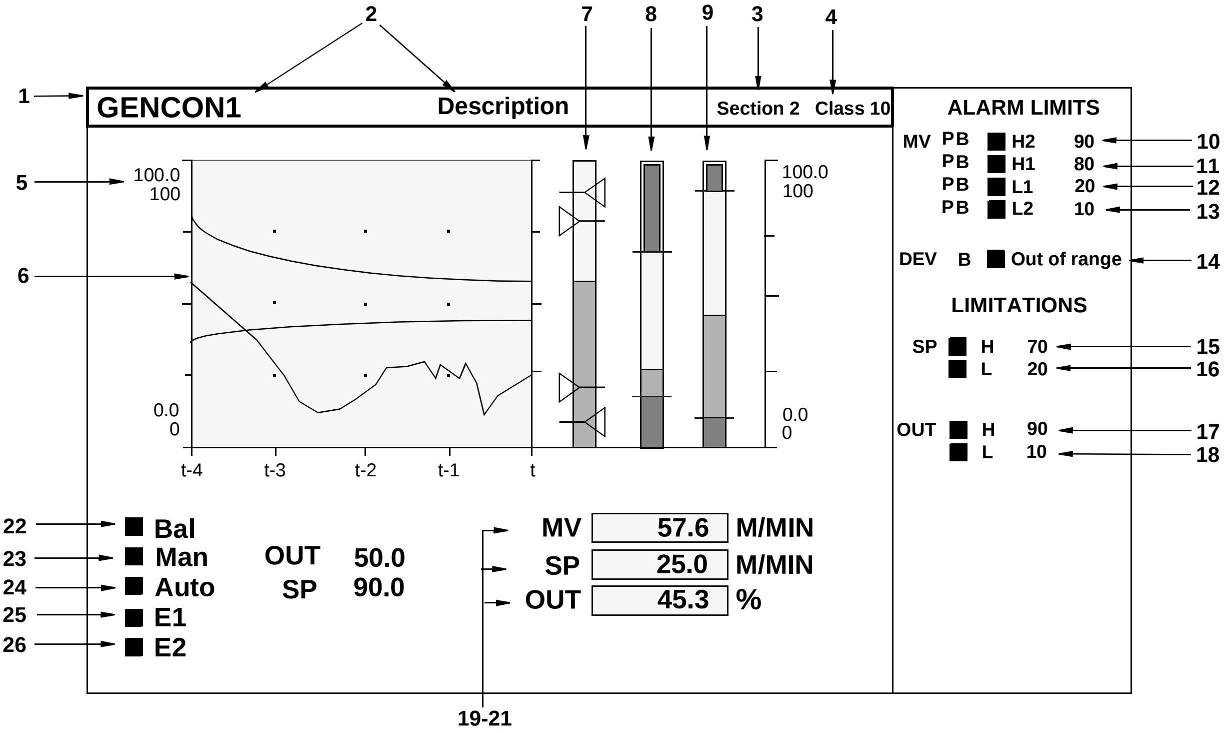
Detailed information about alternative ways of presenting certain status and data within the displays such as color, flashing, blocked etc. is given in the reference manual.

Time-logged Properties

Measured values stored can be presented graphically in the form of curves on the display screen. Such a display, a **trend display**, can consist of 1-4 curves. For the functional unit GENCON the following values can be logged and presented:

Measured value	MV
Setpoint	SP
Output value	OUT

Object display: GCOOB01



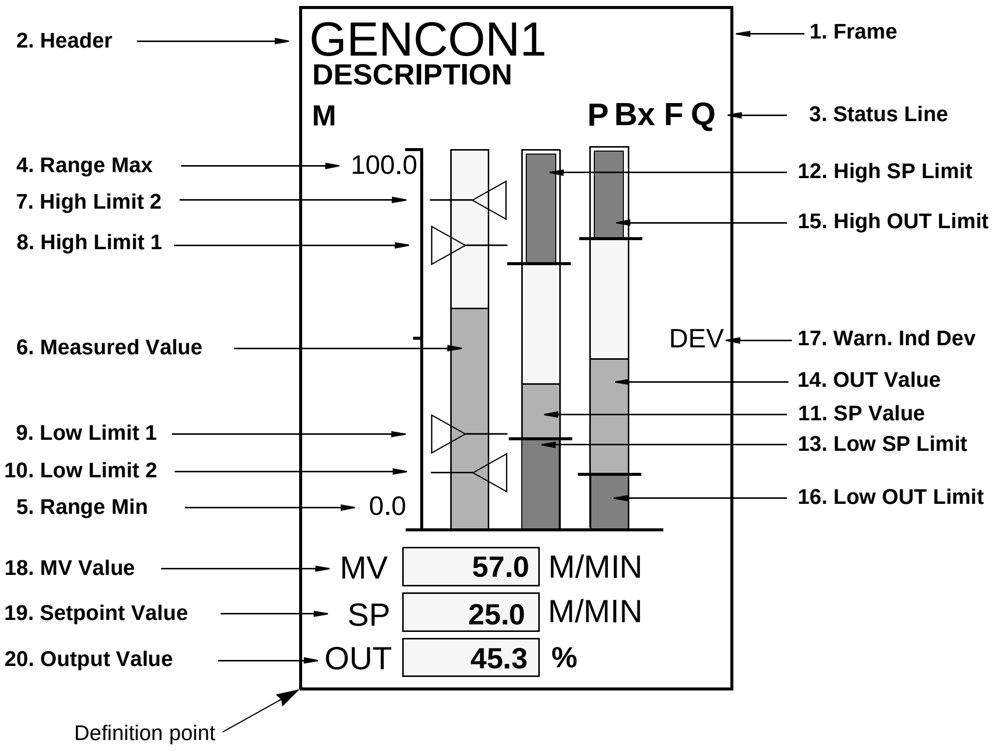
No	Description	Remarks
1	SelectFrame	
2	Header	Object name and description
3.1	Section Text	
3.2	Section Value	Process section
4.1	Class Text	
4.2	Class Value	Object class
5.1	Range MV Max	Range Max of the MV value
5.2	Range OUT Max	Range Max of the OUT value
5.3	Range MV Min	Range Min of the MV value
5.4	Range OUT Min	Range Min of the OUT value
6.1	Measure Value Trim Curve	Object measure value
	Setpoint Value Trim Curve	Object setpoint value
	Output Value Trim Curve	Object output value
7.1	Measured Value Bargraph	

No	Description	Remarks
7.2	High Limit 2	Alarm High limit 2
7.3	High Limit 1	Warning High limit 1
7.4	Low Limit 1	Warning Low limit 1
7.5	Low Limit 2	Alarm Low limit 2
8.1	SP Value	Object setpoint value
8.2	High SP Limit	Upper warning limit output
8.3	Low SP Limit	Lower warning limit output
9.1	OUT Value	Object output value
9.2	High OUT Limit	
9.3	Low OUT Limit	
10	ALARM LIMITS for MV	
10.1	MV Text	
10.2	Printout Blocked	
10.3	Alarm Blocked	

No	Description	Remarks
10.4	Alarm Indication	
10.5	H2 Text	
10.6	H2 Value	High limit 2 value
11.1	Printout Blocked	
11.2	Alarm Blocked	
11.3	Warning Indication	Warning High limit 1
11.4	H1 Text	
11.5	H1 Value	High limit 1value
12.1	Printout Blocked	
12.2	Alarm Blocked	
12.3	Warning Indication	Warning Low limit 1
12.4	L1 Text	
12.5	L1 Value	Low limit 1value
13.1	Printout Blocked	
13.2	Alarm Blocked	
13.3	Alarm Indication	
13.4	L2 Text	
13.5	L2 Value	Low limit 1value
14.1	DEV Text	
14.2	Alarm Blocked	
14.3	Alarm Indication	
14.4	Out of range Text	
15	LIMITATIONS for SP	
15.1	SP Text	
15.2	Warning Indication	Warning Setpoint High
15.3	H Text	
15.4	H Value	Setpoint High value
16.1	Warning Indication	Warning Setpoint Low
16.2	L Text	
16.3	L Value	Setpoint Low value
17	LIMITATIONS for OUT	
17.1	OUT Text	
17.2	Warning Indication	Warning Output High

No	Description	Remarks
17.3	H Text	
17.4	H Value	Output High value
18.1	Warning Indication	Warning Output Low
18.2	L Text	
18.3	L Value	Output Low value
19	Measured Value	
19.1	MV	The MV object value
19.2	MV Value	
19.3	MV Unit	
20	Setpoint Value	The SP object value
20.1	SP	
20.2	SP Value	
20.3	SP Unit	
21	Output Value	The OUT object value
21.1	OUT	
21.2	OUT Value	
21.3	OUT Unit	
21.4	Status Indication	Status - Square indication
22.1	Balance Indication	Balance mode
22.2	Balance Text	
23.1	Man Indication	Manual mode
23.2	Man Text	
23.3	Forced Text	Man Forced mode
23.4	Man Out Text	
23.5	Man Out Value	
24.1	Auto Indication	Auto mode
24.2	Auto Text	
24.3	Auto Setpoint Text	
24.4	Auto Setpoint Value	
25.1	E1 Indication	E1 Mode
25.2	E1 Text	
26.1	E2 Indication	E2 Mode
26.2	E2 Text	

Display Element for Group display: GCOGR01



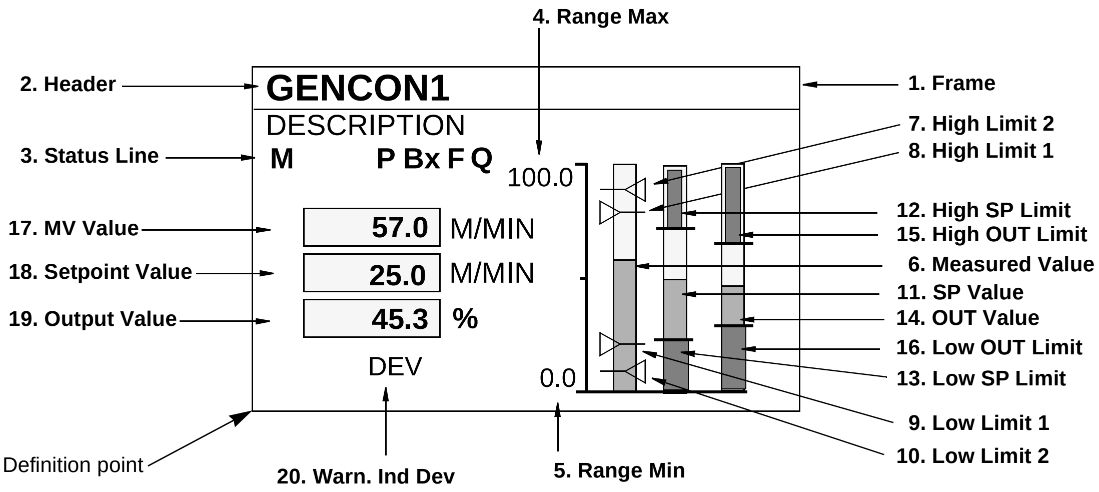
No	Description	Remarks
1	SelectFrame	
2	Header	Object name and description
3	Status Line	
3.1	Mode	
3.2	Printout Blocked	
3.3	Alarm Blocked	
3.4	Alarm Indication	
3.5	Signal Error Indication	
4	Range Max	Range Max of the MV values
5	Range Min	Range Min of the MV values
6	Measured Value Bargraph	
7	High Limit 2	Alarm High limit 2

No	Description	Remarks
8	High Limit 1	Warning High limit 1
9	Low Limit 1	Warning Low limit 1
10	Low Limit 2	Alarm Low limit 2
11	SP Value	Object setpoint value
12	High SP Limit	Upper warning limit setpoint
13	Low SP Limit	
14	OUT Value	Object output value
15	High OUT Limit	Upper warning limit output
16	Low OUT Limit	Lower warning limit output
17	Warning Indication Deviation	Warning indication Devation
18	Measured Value	The MV object value
18.1	MV	

No	Description	Remarks
18.2	MV Value	Measured value
18.3	MV Unit	
19	Setpoint Value	The SP object value
19.1	SP	
19.2	SP Value	Setpoint value
19.3	SP Unit	

No	Description	Remarks
20	Output Value	The OUT object value
20.1	OUT	
20.2	OUT Value	Output value
20.3	OUT Unit	
20.4	Status Indication	Status - Square indication

Display Element for Object closeup display: GCOWI01



No	Description	Remarks
1	SelectFrame	
2	Header	Object name and description
3	Status Line	
3.1	Mode	
3.2	Printout Blocked	
3.3	Alarm Blocked	
3.4	Alarm Indication	
3.5	Signal Error Indication	
4	Range Max	Range Max of the MV values
5	Range Min	Range Min of the MV values

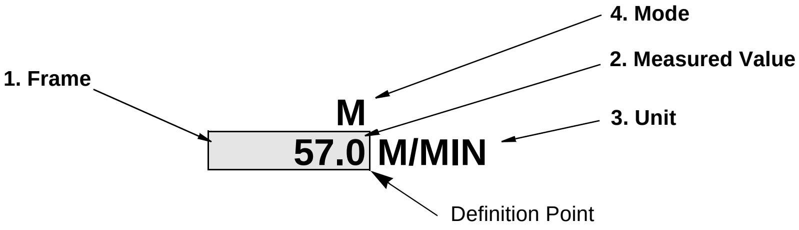
No	Description	Remarks
6	Measured Value Bargraph	
7	High Limit 2	Alarm High limit 2
8	High Limit 1	Warning High limit 1
9	Low Limit 1	Warning Low limit 1
10	Low Limit 2	Alarm Low limit 2
11	SP Value	Object setpoint value
12	High SP Limit	Upper warning limit setpoint
13	Low SP Limit	
14	OUT Value	Object output value
15	High OUT Limit	Upper warning limit output

No	Description	Remarks
16	Low OUT Limit	Lower warning limit output
17	Measured Value	The MV object value
17.1	MV Value	Measured value
17.2	MV Unit	
18	Setpoint Value	The SP object value
18.1	SP Value	Setpoint value

No	Description	Remarks
18.2	SP Unit	
19	Output Value	The OUT object value
19.1	OUT Value	Output value
19.2	OUT Unit	
19.3	Status Indication	Status - Square indication
20	Warning Indication Deviation	Warning indication Devation

Display Element for Process display:

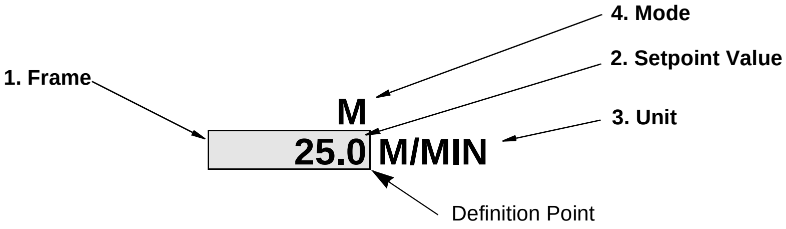
GCOPD01



No	Description	Remarks
1	SelectFrame	
2	Measured Value	

No	Description	Remarks
3	Unit	
4	Mode	

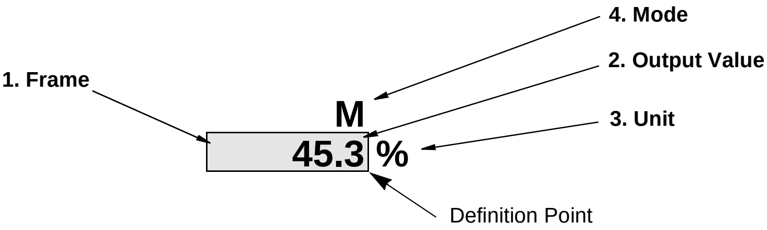
GCOPD02



No	Description	Remarks
1	SelectFrame	
2	Setpoint Value	

No	Description	Remarks
3	Unit	
4	Mode	

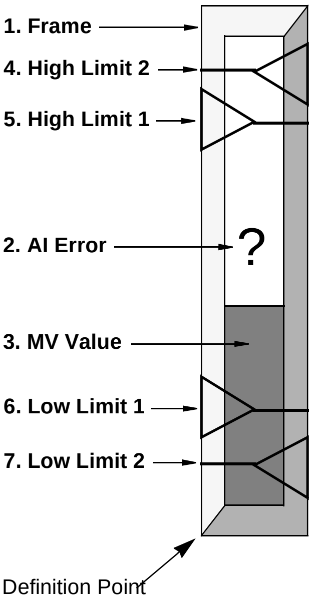
GCOPD03



No	Description	Remarks
1	SelectFrame	
2	Output Value	

No	Description	Remarks
3	Unit	
4	Mode	

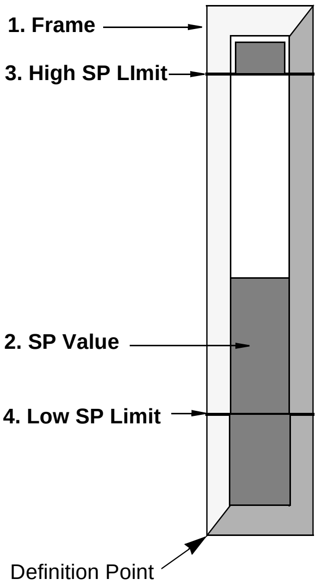
GCOPD51



No	Description	Remarks
1.1	SelectFrame	
1.2	TopLeftEdge	
1.3	BottomRightEdge	
2	AI Error	
3	Measured Value	

No	Description	Remarks
4	High Limit 2	Alarm High limit 2
5	High Limit 1	Warning High limit 1
6	Low Limit 1	Warning Low limit 1
7	Low Limit 2	Alarm Low limit 2

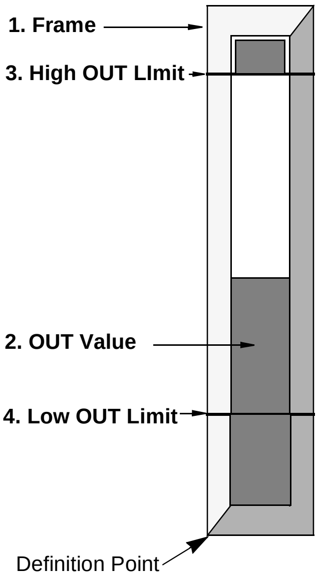
GCOPD52



No	Description	Remarks
1.1	SelectFrame	
1.2	TopLeftEdge	
1.3	BottomRightEdge	

No	Description	Remarks
2	Setpoint Value	
3	High SP Limit	
4	Low SP Limit	

GCOPD53



No	Description	Remarks
1.1	SelectFrame	
1.2	TopLeftEdge	
1.3	BottomRightEdge	

No	Description	Remarks
2	Output Values	
3	High OUT Limit	
4	Low OUT Limit	

2.5.2 Dialog

The display screen is supplemented with a keyboard for operator communication with the functional unit/object.

The dialog is built up using both fixed and dynamic keys. The functions available with the dynamic keys are presented in a pattern of rectangles on the lower part of the display screen when the object is selected. The functional unit GENCON has a MIN dialog (Production level) and a MAX dialog (Maintenance level).

The MIN dialog consists of an output dialog with 1 subdialog. The MAX dialog consists of an output dialog with 3 subdialogs.

MIN dialog (No authority key)

Keyboard keys

Man	**Man**	Set to manual mode
Auto	**Auto**	Set to automatic mode
E1	**E1**	Set to external1 mode
E2	**E2**	Set to external2 mode
✓	**Acknowledge**	Acknowledge alarm
Object	**Object Display**	Select Object Display
📈	**Object Trend**	Select Object Trend
Dialog	**Previous Level**	Select Top Level dynamic keys
+ ↑	**Increase**	Increase output value with 0.5 (if MAN = 1) Increase setpoint value with 0.5%
⇧ Shift + + ↑		Increase output value with 5.0 (if MAN = 1) Increase setpoint value with 5.0%
↓ −	**Decrease**	Decrease output value with 0.5 (if MAN = 1) Decrease setpoint value with 0.5%
⇧ Shift + ↓ −		Decrease output value with 5.0 (if MAN = 1) Decrease setpoint value with 5.0%

Dynamic keys, Top Level

D1 Man Forced	D2	D3	D4	D5
D6 OUT	D7 SP	D8	D9	D10 *Keyboard…*

Man Forced	Set to manual forced mode
OUT	Check/change output value
SP	Check/change setpoint value
Keyboard…	Select Dynamic keys: Keyboard

Dynamic keys, Keyboard

D1 ↑ Increase	D2 Man	D3 Auto	D4 E1	D5 E2
D6 ↓ Decrease	D7 Acknowledge	D8 Object Display	D9 Object Trend	D10

Increase	Increase output value with 0.5 (if MAN=1) Increase setpoint value with 0.5%
Man	Set to manual mode
Auto	Set to automatic mode
E1	Set to external1 mode
E2	Set to external2 mode
Decrease	Decrease output value with 0.5 (if MAN=1) Decrease setpoint value with 0.5%
Acknowledge	Acknowledge alarm
Object Display	Select Object Display
Object Trend	Select Object Trend

MAX dialog (Authority key)

Keyboard keys

Man	**Man**	Set to manual mode
Auto	**Auto**	Set to automatic mode
E1	**E1**	Set to external1 mode
E2	**E2**	Set to external2 mode
✓	**Acknowledge**	Acknowledge alarm
Object	**Object Display**	Select Object Display
📈	**Object Trend**	Select Object Trend
Dialog	**Previous Level**	Select Top Level dynamic keys
Dialog	**Next Block**	Page between the dynamic key sets (Keyboard)
+ ↑	**Increase**	Increase output value with 0.5 (if MAN = 1) Increase setpoint value with 0.5%
⇧ Shift **+** + ↑		Increase output value with 5.0 (if MAN = 1) Increase setpoint value with 5.0%
↓ −	**Decrease**	Decrease output value with 0.5 (if MAN = 1) Decrease setpoint value with 0.5%
⇧ Shift **+** ↓ −		Decrease output value with 5.0 (if MAN = 1) Decrease setpoint value with 5.0%

Dynamic keys, Top Level

D1 Man Forced	D2	D3	D4	D5
D6 OUT	D7 SP	D8 *Block…*	D9 *Limits…*	D10 *Keyboard…*

Man Forced	Set to manual forced mode
OUT	Check/change output value
SP	Check/change setpoint value
Block…	Select Dynamic keys: Block
Limits…	Select Dynamic keys: Limits
Keyboard…	Select Dynamic keys: Keyboard

Dynamic keys, Keyboard

D1 ↑ Increase	D2 Man	D3 Auto	D4 E1	D5 E2
D6 ↓ Decrease	D7 Acknowledge	D8 Object Display	D9 Object Trend	D10

Increase	Increase output value with 0.5 (if MAN=1) Increase setpoint value with 0.5%
Man	Set to manual mode
Auto	Set to automatic mode
E1	Set to external1 mode
E2	Set to external2 mode
Decrease	Decrease output value with 0.5 (if MAN=1) Decrease setpoint value with 0.5%
Acknowledge	Acknowledge alarm
Object Display	Select Object Display
Object Trend	Select Object Trend

Dynamic keys, Block…

D1 Block Alarm	D2	D3	D4	D5
D6 Deblock Alarm	D7	D8	D9	D10

Block Alarm	Block alarm indication
Deblock Alarm	Deblock alarm indication

Dynamic keys, Limits…

D1 H1 80.00	D2 H2 90.00	D3 SP H 50.00	D4	D5 OUT H 100.00
D6 L1 20.00	D7 L2 10.00	D8 SP L 10.00	D9	D10 OUT L 0.00

H1	Check/change measured value warning limit H1
H2	Check/change measured value alarm limit H2
SP H	Check/change upper warning limit setpoint
OUT H	Check/change upper warning limit output
L1	Check/change measured value warning limit L1
L2	Check/change measured value alarm limit L2
SP L	Check/change lower warning limit setpoint
OUT L	Check/change lower warning limit output

Variation possibilities

A certain variation possibility is available in both dialogs by using VALALWD and ORDALWD which are included in the data base element. They can be used to block individual orders and numerical values in the dialogs. See data base element population as described in Section 2.5 Data Base Element GENCON. Note that the blocked dynamic key remains in the dialog. If a blocked key is depressed, an error message is presented on the error message line and the command is not executed. Text on the dynamic function keys can be changed however by editing in a specific static display. When editing, the dialog text for all instances of the reftype to which the dialog belongs is changed.

2.5.3 Event Handling

The event handling detects changes in the STATUS word and other status signals.

All of these possible alarms and events are separated into groups.

A reference, an Event Treat pointer, is provided in the data base element for each of these groups. The event handling can locate, via this reference, the place in its own data base which discribes the procedures to be followed in the case of the current event/alarm. The events associated with the different Event Treat pointers are shown in the table below. Here are also shown the standard texts for the default values on the Event Treat pointers and which pointers each event produces if the user wants to define his own event texts.

This is explained in further detail in the manual *AdvaCommand Basic Functions User's Guide*.

Table 2-1. Event Texts for GENCON

Events	**Event Treat pointer**	**Property text**		**Event text**	
		Standard text	**Line No in Event Treat**	**Standard text**	**Line No in Event Treat**
AI-error On	AL_TR	AISign Err	1	Alarm	1
AI-error Off	AL_TR	AISign Err	1	Normal	2
Limit for control deviation exceeded	AL_TR	Big Dev	4	Alarm	1
Limit for control deviation re-entered	AL_TR	Big Dev	4	Normal	2
Upper limit H2 for measured value exceeded	AL_TR	MV>H2	5	Alarm	1
Upper limit H2 for measured value re-entered	AL_TR	MV>H2	5	Normal	2
Upper limit H1 for measured value exceeded	AL_TR	MV>H1	6	Alarm	1
Upper limit H1 for measured value re-entered	AL_TR	MV>H1	6	Normal	2
Lower limit L1 for measured value exceeded	AL_TR	MV<L1	7	Alarm	1
Lower limit L1 for measured value re-entered	AL_TR	MV<L1	7	Normal	2
Lower limit L2 for measured value exceeded	AL_TR	MV<L2	8	Alarm	1
Lower limit L2 for measured value re-entered	AL_TR	MV<L2	8	Normal	2

Table 2-1. Event Texts for GENCON (Continued)

Events	**Event Treat pointer**	**Property text**		**Event text**	
		Standard text	**Line No in Event Treat**	**Standard text**	**Line No in Event Treat**
Max limit for output sign On	LIM_TR	SpMaxLim	1	On	1
Max limit for output sign Off	LIM_TR	SpMaxLim	1	Off	2
Min limit for output sign On	LIM_TR	SpMinLim	2	On	1
Min limit for output sign Off	LIM_TR	SpMinLim	2	Off	2
Max limit for output sign On	LIM_TR	OpMaxLim	3	On	1
Max limit for output sign Off	LIM_TR	OpMaxLim	3	Off	2
Min limit for output sign On	LIM_TR	OpMinLim	4	On	1
Min limit for output sign Off	LIM_TR	OpMinLim	4	Off	2
Op. mode Balance On	IND_TR	Balance	1	On	1
Op. mode Balance Off	IND_TR	Balance	1	Off	2
Op. mode Manual Forced On	IND_TR	ManFrced	2	On	1
Op. mode Manual Forced Off	IND_TR	ManFrced	2	Off	2
Op. mode Manual On	IND_TR	Manual	3	On	1
Op. mode Manual Off	IND_TR	Manual	3	Off	2
Op. mode Auto On	IND_TR	Auto	4	On	1
Op. mode Auto Off	IND_TR	Auto	4	Off	2
Op. mode E1 On	IND_TR	E1	5	On	1
Op. mode E1 Off	IND_TR	E1	5	Off	2
Op. mode E2 On	IND_TR	E2	6	On	1
Op. mode E2 Off	IND_TR	E2	6	Off	2
Controller output On	IND_TR	Controller	9	On	1
Controller output Off	IND_TR	Controller	9	Off	2
Controller On Binary control	IND_TR	BinCtrl	10	On	1
Controller Off Binary control	IND_TR	BinCtrl	10	Off	2

Event treat pointers

The pointers can be allocated other values to permit use of own texts and/or remove certain printouts.

If a pointer is set to 0, this means that all event handling of all events associated with the pointer is stopped.

See the manual *AdvaCommand User Interface Reference Manual* for the result of using other references.

AL_TR:

The default value =2, which means alarm when a signal enters alarm condition and event when a signal leaves alarm condition. The printout format is as shown in Figure 2-2

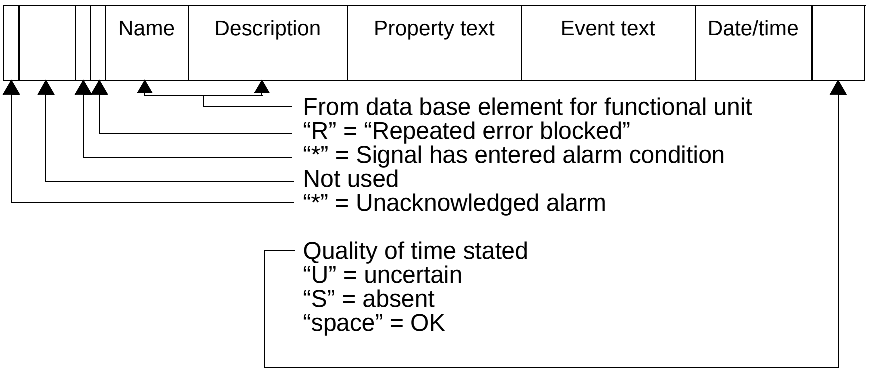

Name
Description
Property text
Event text
Date/time
From data base element for functional unit
“R” = “Repeated error blocked”
“*” = Signal has entered alarm condition
Not used
“*” = Unacknowledged alarm
Quality of time stated
“U” = uncertain
“S” = absent
“space” = OK

Figure 2-2. Format of printout in alarm and event list

```
*     *  LICA 126     Secondary Water Tank        AI Error     Alarm      94-11-16 16:21:44:727
```

Figure 2-3. Printout from an AI-error

LIM_TR:

Default value = 1 which means event when a numerical value has been limited and when the limitation has ceased. The format of the printout is the same as for AL_TR.

IND_TR:

Default value = 1 which means event when an indication changes value. The format of the printout is the same as for AL_TR.

Alarm handling

One of the groups described in the section about Event handling can be handled as an alarm. The corresponding Event Treat pointer is designated AL_TR.

The following signals are included.

- ALAI - error developed at the analog input which provides the function unit with its measured value.
- ALDEV - control deviation excessive.
- ALLIMH2, ALLIMH1, ALLIML1 and ALLIML2 - the measured value has passed the corresponding limit.

Blocking function

Alarm and event handling can be blocked from

- The dialog
- The data base element (configuration parameters)
- The control program

Blocking from the dialog sets the flags AL_BLK, EV_BLK and PR_BLK in the data base element. I.e. both displays and lists are blocked with respect to alarms and events included in the groups AL_TR, LIM_TR and IND_TR.

Blocking from the dialog is indicated in the displays with a B or with a square in front of an explanatory text.

Blocking from the data base element can be performed by setting a zero on the corresponding EVENT TREAT pointer. No indiction of this is given on the displays.

Default values can also be given to the flags AL_BLK, EV_BLK and PR_BLK. These will however be written over by the dialog.

Blocking in this way is indicated in the displays in the same way as blocking from the dialog.

Blocking from the control program is made in a conven-tional way with help of logic elements, switches etc. If indication in displays is wished the blocking control signal should also be connected to data base element connection AUTO_BLK.

2.5.4 Group Alarm

It is possible to connect the functional unit GENCON to the group alarm function. This function makes it possible to gather alarms and events from related process signals and objects into Alarm Groups. These groups are then treated as objects.

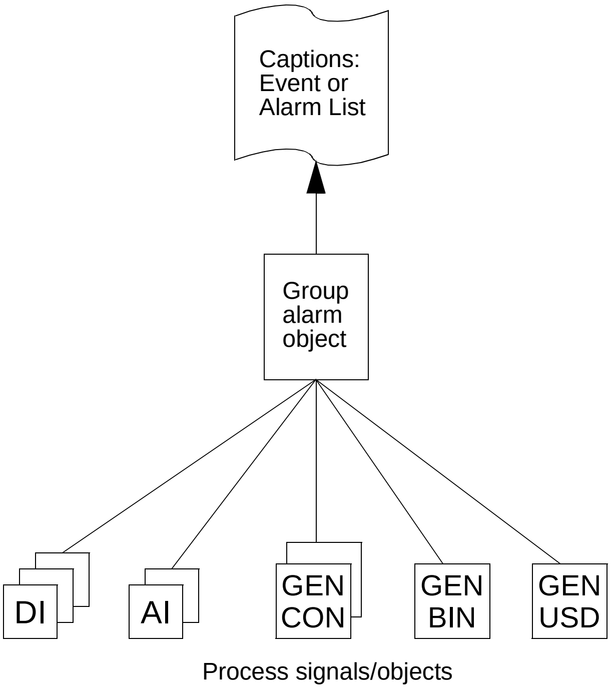


Figure 2-4. Group Alarm

The group alarm function consists of four parts as follows:

- Grouping of process alarms and events.
- Blocking of groups
- Automatic acknowledgement
- External alarm outputs

For a more detailed description of the group alarm function, reference is made to the manual *AdvaCommand Basic Functions User's Guide*.

2.6 Application Example

As mentioned above, the PC program is user defined. This means that the user is responsible for both the control-technique and the connection to the data base.

An example of how the different terminals in the data base element can be utilized and how a simple control function can be implemented is shown in Figure 2-4. Note in particular that the terminal is either direct or via the PC elements GENCON-O and GENCON-I.

2.6.1 PC Program Example

Figure 2-5 to Figure 2-7 shows a PC program for a simple PI-control system built up with the GENCON functional unit and elements from the standard Advant Controller 410/450 function library. The operator can select two control modes, MAN and AUTO. Alarms are given when the measured value and the control deviation has passed high and low alarm limits and when there is an error on the AI-channel. Note that the alarm detection is performed in the PC program and that the status signals for alarm are sent via the PC element GENCON-I to Advant Station 500 Series Operator Station for presentation in alarm and event lists. When populating the GENCON data base element, ORDALWD should be set to H’000C to block orders to non-existent operation modes. VALALWD however can retain its default value H’1FFD which means that changes of all numerical values in the controller are permitted.

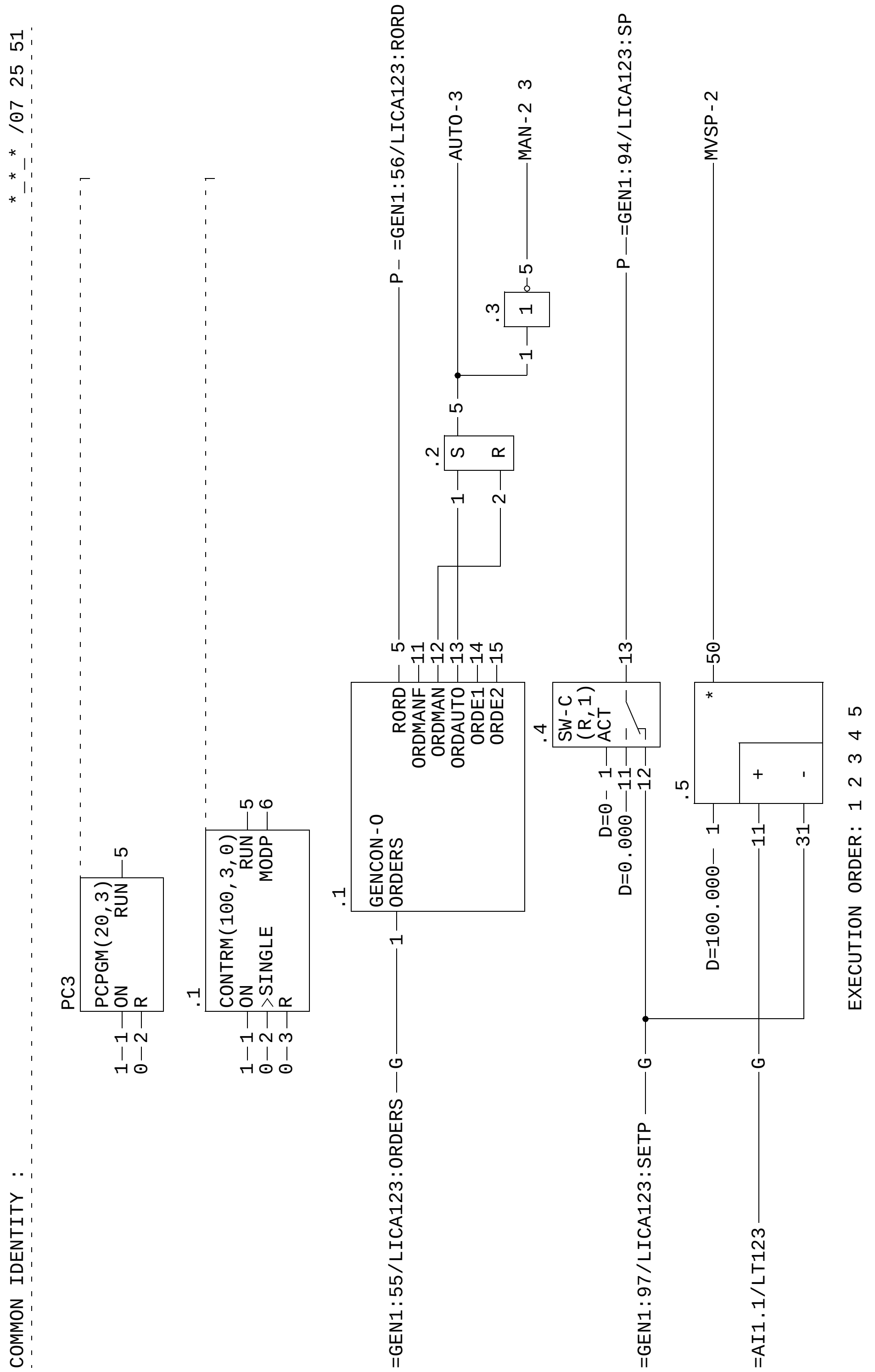


Figure 2-5. PC program example

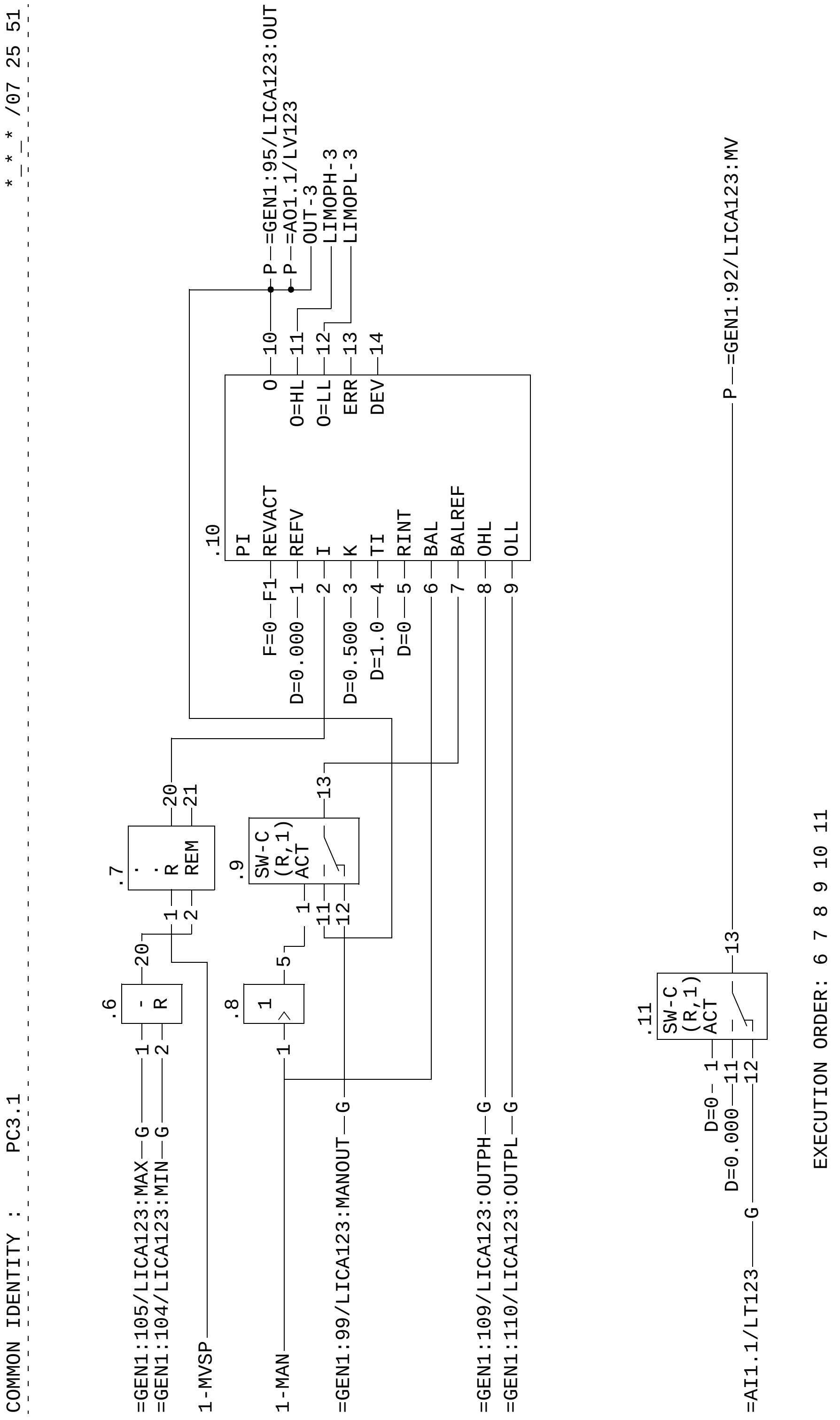


Figure 2-6. PC program example

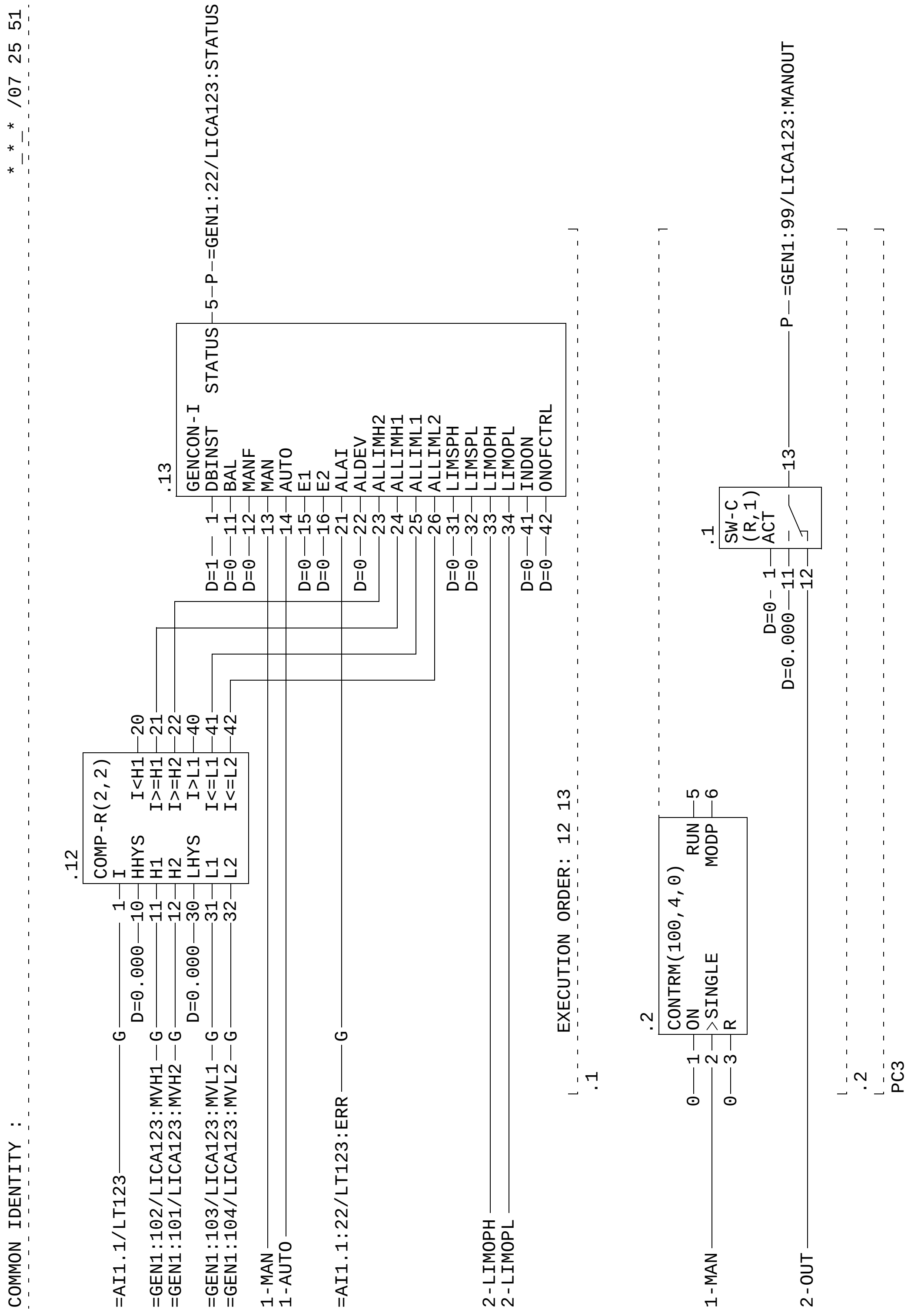


Figure 2-7. PC program example

Chapter 3 GENBIN

3.1 General

The GENBIN general binary controller is includedin a group of functional units which supplement the Advant Controller 410/450 function libraries and permit simplified implementation of process instrumentation functions.

Characteristic of these units is that their operation is adapted to standardized functions in the operator station.

GENBIN, by virtue of its design, with a user-defined PC program, coupled via special PC elements to the operator functions of the functional unit, is suitable for use in both simpler and more sophisticated control operations.

Summarizing, the following functions and properties are of special importance:

- User defined control function
- Displays and dialogs well adapted to motor and valve control.

3.2 Configuration

The binary controller GENBIN consists of 4 parts:

1. A user defined PC program which solves the control algorithm. This program is an assembly of Advant Controller 410/450 PC elements.
2. Two PC elements which function as interfaces for logical signals between the PC program and the data base. These PC elements are handled in the same way as other PC elements in the Advant Controller 410/450 products.
3. A section for operator functions which consists of both presentation and dialog functions. Parameters and data from the process are presented on the display screen. A keyboard on which the operator can change e.g. operation mode is used for the dialog. The results of the operator’s control actions are presented on the display screen. The application work for this part is limited, as standard, to display disposition.
4. A data base element with configuration constants and dynamic data which constitute an interface to the operator functions.

Figure 3-1 illustrates the relationship between these parts.

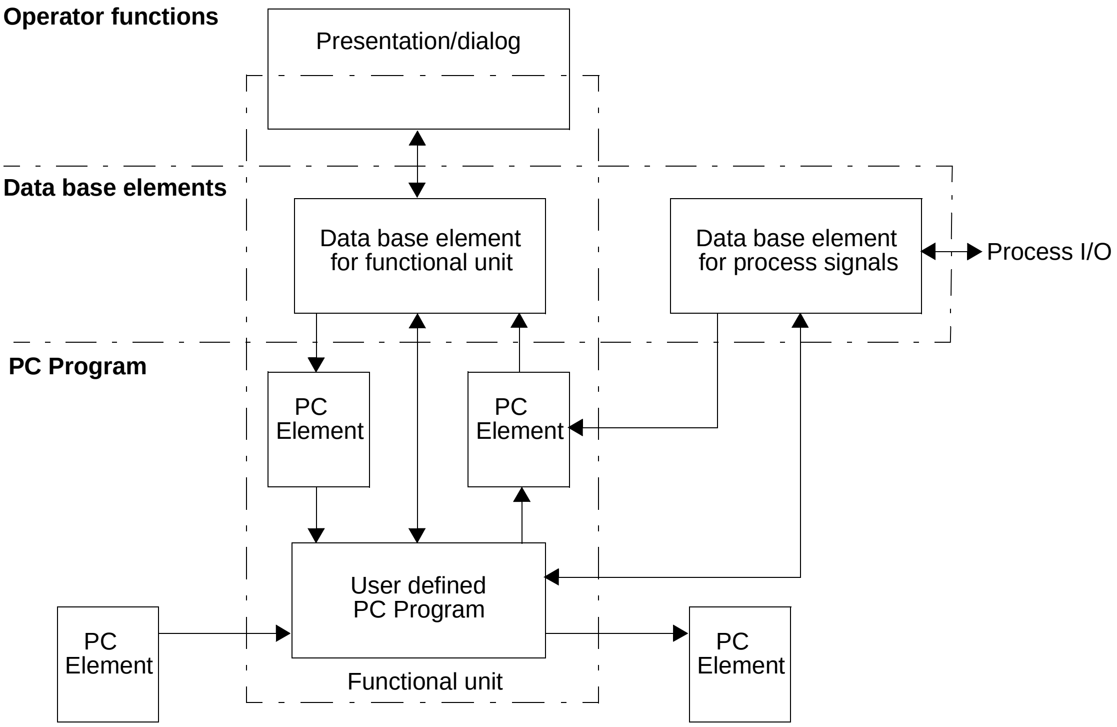


Figure 3-1. Functional Unit, Principle diagram

3.3 Function

Though GENBIN is a general tool which enables the user to create desired control functions, it is not possible as it is for other functional units outside the GENXXX family, to give a control function orientated description. The possibilities given with GENBIN are instead described with connection descriptions for PC elements and data base elements.

3.4 PC Elements

The PC elements GENBIN-O (GENeral object BINary controller Order element) and GENBIN-I (GENeral object BINary controller Indication element) are used as interfaces for logical signals between the user defined PC program and the data base element.

These data sheets are included in the manual *PC Elements Advant Controller 400 Series Reference Manual* in which all of the elements included in the Advant Controller 410/450 products are assembled.

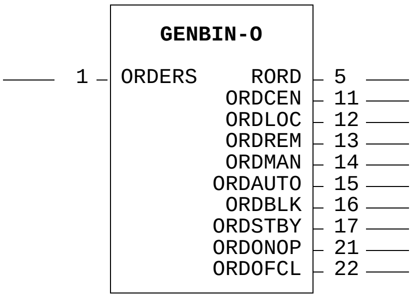
3.4.1 PC Element GENBIN-O

Binary Functional Unit, Outputs GENBIN-O

Summary

GENBIN-O (**GEN**eral **BIN**ary controller - **O**utputs) is used as an interface for binary signals between Advant Station 500 series OS and the user's PC program. The element forms part of the functional unit GENBIN.

Call GENBIN-O



PC element GENBIN-O

Terminal Description

No	Name	Type	Description
1	ORDERS	IIL	Connection to ORDERS on the data base element for reading the values at the order outputs.
5	RORD	OI	**R**eset **ORD**er. Connection to RORD on the data base element to obtain pulsed outputs.
11	ORDCEN	OB	**ORD**er output operator position **CEN**tral. Ordering of central operator position.
12	ORDLOC	OB	**ORD**er output operation position **LOC**al. Ordering of local operator position.
13	ORDREM	OB	**ORD**er output operator position **REM**ote. Ordering of remote control.
14	ORDMAN	OB	**ORD**er output **MAN**ual mode. Ordering of manual operation.
15	ORDAUTO	OB	**ORD**er output **AUTO** mode. Ordering of automatic operation.
16	ORDBLK	OB	**ORD**er output **BL**oc**K**ed mode. Ordering of blocking.
17	ORDSTBY	OB	**ORD**er output **ST**and **BY** mode. Ordering of standby.
21	ORDONOP	OB	**ORD**er output **ON**/**OP**en. On-order.
22	ORDOFCL	OB	**ORD**er output **OF**f/**CL**ose. Off-order.

3.4.1.1 Outputs to PC Program

The Boolean outputs on the element are order outputs. These outputs are connected to inputs on PC elements in the user defined PC program to permit the transmission of orders from the dialog to the PC. The outputs on the element adapt the values in ORDERS in the data base element. If more than one bit in ORDERS is set to 1 priorities in accordance with the following are obtained at the outputs.

Only one of the outputs ORDCEN, ORDLOC and ORDREM can be set to 1.

The priorities are so established that the first (in accordance with their listing in the PC element) order output which corresponding ORDERS-bit is 1 is set to 1, the other two are set to 0. The outputs ORDMAN, ORDAUTO, ORDBLK and ORDSTBY are processed in the same way as ORDCEN, ORDLOC and ORDREM. The outputs ORDONOP and ORDOFCL are given no priority.

3.4.1.2 Connections to Data Base Elements

The input ORDERS is connected to ORDERS in the data base element. Values from the order section of the dialog are stored in ORDERS.

The element has one output, RORD, to the data base element. The output RORD (Reset ORDer) is used to determine if the order outputs are pulsed or static outputs. When RORD is connected to the data base element, one output is cleared immediately after it has been set, this resulting in pulsed outputs. If RORD is not connected to the data base element, the outputs are not automatically cleared. It is not possible to have an output or a group of outputs as pulsed outputs and the others as static.

Please observe that the terminal RORD must be connected to the data base element.

Also observe that PC program writes and reads **real values** in the data base element directly.

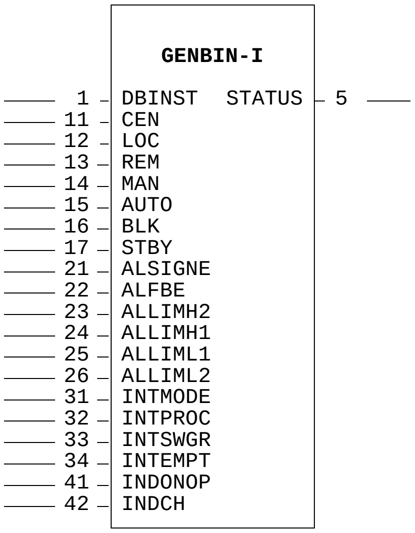
3.4.2 PC Element GENBIN-I

Binary Functional Unit, Inputs GENBIN-I

Summary

GENBIN-I (**GEN**eral **BIN**ary controller **- I**nputs) is used as an interface for binary signals between the user’s PC program and the data base element. The element forms part of the functional unit GENBIN.

Call GENBIN-I



PC element GENBIN-I

Terminal Description

No	Name	Type	Description
1	DBINST	II	**D**ata **B**ase **INST**ance. An operational parameter or a constant, defining the instance number of the data base element (to be defined in its header). Alternatively, a connection to the data base element.
5	STATUS	OIL	Connection to STATUS on the data base element for writing the values at the indication inputs.
11	CEN	IB	Operator position indication **CEN**tral. Indication of operator position.
12	LOC	IB	Operator position indication **LOC**al. Indication of operator position.
13	REM	IB	Operator position indication **REM**ote. Indication of operator position.
14	MAN	IB	Operation mode indication **MAN**ual. Indication of operation mode.
15	AUTO	IB	Operation mode indication **AUTO**. Indication of operation mode.
16	BLK	IB	Operation mode indication **BL**oc**K**ed. Indication of operation mode.
17	STBY	IB	Operation mode indication **ST**and **BY**. Indication of operation mode.
21	ALSIGNE	IB	**AL**arm indication, **SIGN**al **E**rror. Output for indication of signal error.
22	ALFBE	IB	**AL**arm indication, **F**eed**B**ack **E**rror. Output for indication of feedback error.

Terminal Description

No	Name	Type	Description
23	ALLIMH2	IB	**AL**arm **LIM**it **H**igh **2**. The measured value has exceeded upper alarm limit 2.
24	ALLIMH1	IB	**AL**arm **LIM**it **H**igh **1**. The measured value has exceeded upper alarm limit 1.
25	ALLIML1	IB	**AL**arm **LIM**it Low **1**. The measured value has fallen blow lower alarm limit 1.
26	ALLIML2	IB	**AL**arm **LIM**it **L**ow **2**. The measured value has fallen below lower alarm limit 2.
31	INTMODE	IB	**INT**erlock **MODE**. Indication of operation mode interlock.
32	INTPROC	IB	**INT**erlock **PROC**ess. Indication of process Interlock.
33	INTSWGR	IB	**INT**erlock **SW**itCH **G**ea**R**. Indication of switch- gear interlock.
34	INTEMTP	IB	**INT**erlock **EM**ergency **T**ri**P**. Indication of emergency trip interlock.
41	INDONOP	IB	**IND**ication **ON/OP**en. Indication of on/open.
42	INDCH	IB	**IND**ication **CH**anging. Indication of change in progress.

3.4.2.1 Inputs from PC Program

The Boolean terminals on the element are indication inputs. These terminals can be connected to other PC elements in the user defined PC program. A change in one or several indications are designated an event. An event is reported to the operator station for any event printout necessary and for presentation in displays.

3.4.2.2 Connections to Data Base Elements

The input DBINST is connected to the data base element. DBINST holds information about the instance number of the data base element.

The element has one output, STATUS, to the data base element. The output STATUS is connected to STATUS in the data base element. The indictions are sent, in STATUS, up to the data base element for further presentation in the operator station.

Please observe that the PC program writes and reads **real values** in the data base element directly.

3.5 Data Base Element GENBIN

Information about the data base element in the functional unit GENBIN is given in data sheet form. This data sheet is included in the manual *Data Base Elements Advant Controller 400 Series Reference Manual* in which all of the data base elements included in the Advant Controller 410/450 products are assembled.

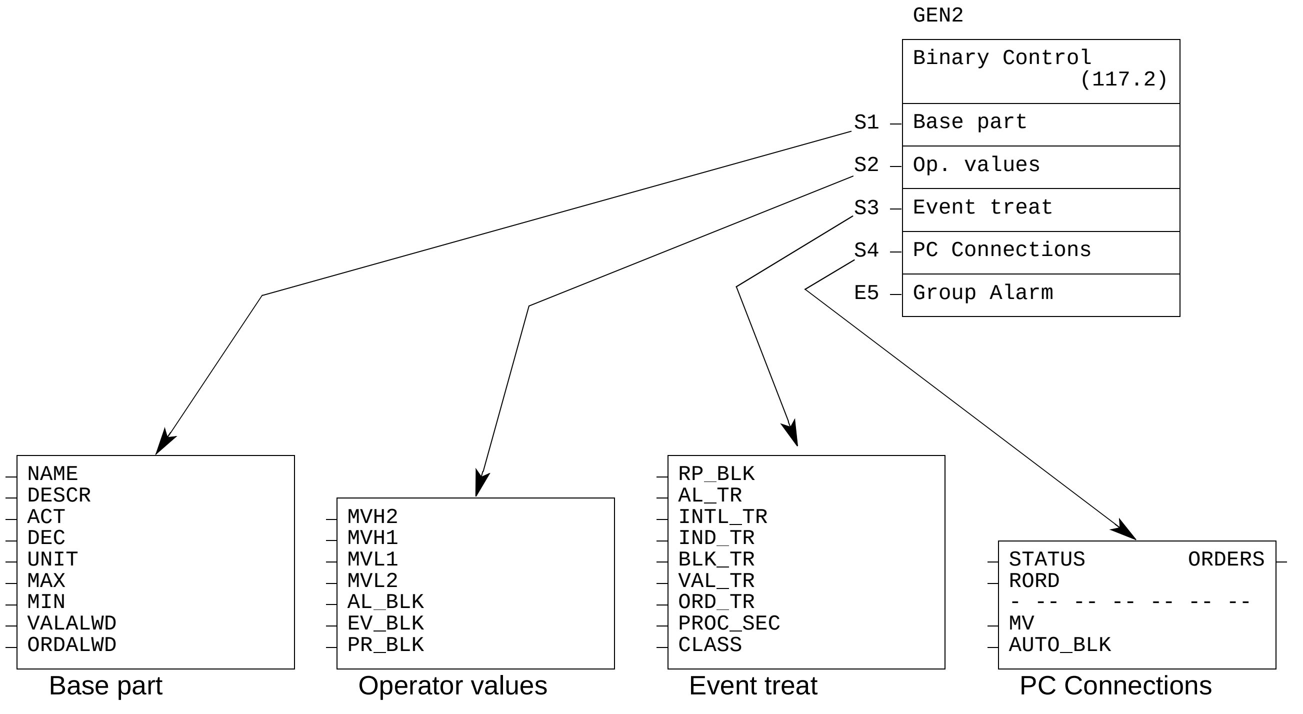
Binary Control GENBIN

Summary

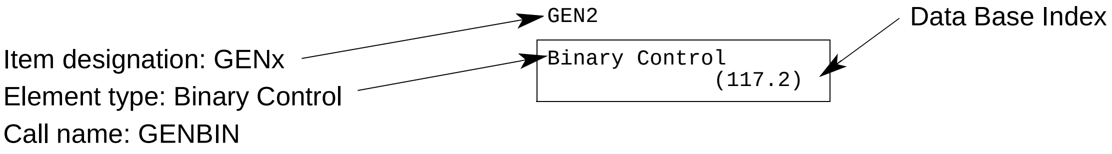
The Binary Control data base element is used to build up Advant Station 500 Series Operator Station functions for the GENBIN functional unit. Some static information in the displays are given. Parameters which can be changed from dialog can be given start values. The element performs an interface between the PC-program/process function and Advant Station 500 Series Operator Station.

For information about the extension parts of Group Alarm see data base element Group Member.

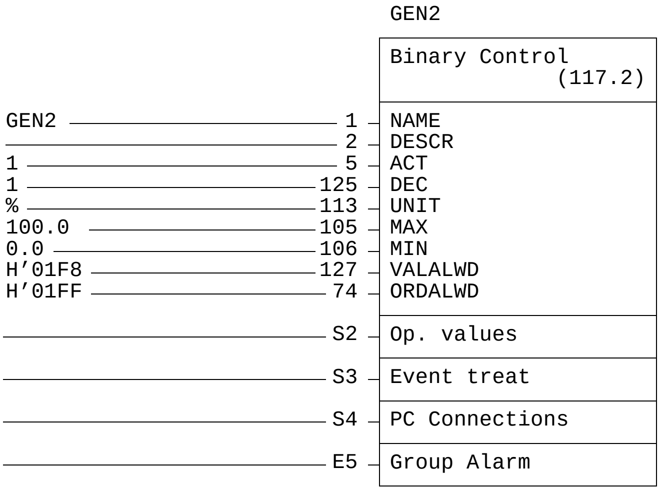
Overview



Head



Base part



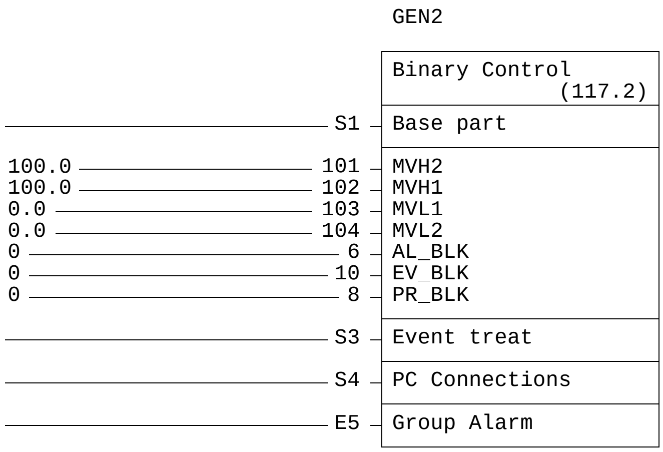
Terminal Description, Base part

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
1	NAME	user	GENx	–	Every Binary Control must have a unique **NAME**.	Max. 20 characters. Spaces are not allowed.
2	DESCR	user	–	–	**DESCR**iption of Binary Control shown in Operator Station.	Max. 20 characters. Any information regarding Binary Control may be entered.
5	ACT	user	1	B(r)	1=operator communication is **ACT**ive.	0=dialog is blocked and events are not updated.
125	DEC	user	1	–	Number of **DEC**imals to be used for alarm limits, range limits (range max and range min), setpoint and autoset point.	A maximum of 5 digits, plus sign and decimal point may be displayed. 0..4 decimals.

Terminal Description, Base part (Continued)

<table>
<tr><th>Termi-nal No</th><th>Terminal Name</th><th>Value entered by</th><th>Default value</th><th>PC con-nection data type</th><th>Description</th><th colspan="3">Remarks</th></tr>
<tr><td>113</td><td>UNIT</td><td>user</td><td>%</td><td>A6(r)</td><td>The **UNIT** of the measured value in engineering unit.</td><td colspan="3">Maximum 6 characters shown in Operator Station and data base element.</td></tr>
<tr><td>105</td><td>MAX</td><td>user</td><td>100.0</td><td>R(r/w)</td><td>**MAX**imum value within measuring range.</td><td colspan="3">Used for scaling of bar graph.</td></tr>
<tr><td>106</td><td>MIN</td><td>user</td><td>0.0</td><td>R(r/w)</td><td>**MIN**imum value within measuring range.</td><td colspan="3">Used for scaling of bar graph.</td></tr>
<tr><td rowspan="7">127</td><td rowspan="7">VALALWD</td><td rowspan="7">user</td><td rowspan="7">H’01F8</td><td rowspan="7">I(r/w)</td><td rowspan="7">**VAL**ue **AL**lo**W**e**D**.
Group of data consisting of the values which are changable from the dialog. Each available value is represented by a flag in VALALWD. If it is allowed to change a value from the dialog its corresponding flag is set to 1. The default value gives the possibility to change all values that are available from the dialog. How VALALWD is calculated is shown in the table to the right.</td><td>Value</td><td>Bit value</td><td>Def. Hex. value</td></tr>
<tr><td>MVH2</td><td>8</td><td>8</td></tr>
<tr><td>MVH1</td><td>1</td><td rowspan="4">F</td></tr>
<tr><td>MVL1</td><td>2</td></tr>
<tr><td>MVL2</td><td>4</td></tr>
<tr><td>MAX</td><td>8</td></tr>
<tr><td>MIN</td><td>1</td><td>1</td></tr>
<tr><td rowspan="10">74</td><td rowspan="10">ORDALWD</td><td rowspan="10">user</td><td rowspan="10">H’01FF</td><td rowspan="10">I(r/w)</td><td rowspan="10">**ORD**er **AL**lo**W**e**D**.
Group of data consisting of the manual orders which are allowed to give from the dialog. Each available order is represented by a flag in ORDALWD. If it is allowed to give an order from the dialog, its correspon-ding flag is set to 1. The default value gives the possibility to give all orders that are available from the dialog. How ORDALWD is calculated is shown in the table to the right.</td><td>Manual order</td><td>Bit value</td><td>Def. Hex. value</td></tr>
<tr><td>ORDCEN</td><td>1</td><td rowspan="4">F</td></tr>
<tr><td>ORDLOC</td><td>2</td></tr>
<tr><td>ORDREM</td><td>4</td></tr>
<tr><td>ORDMAN</td><td>8</td></tr>
<tr><td>ORDAUTO</td><td>1</td><td rowspan="4">F</td></tr>
<tr><td>ORDBLK</td><td>1</td></tr>
<tr><td>ORDSTBY</td><td>4</td></tr>
<tr><td>ORDONOP</td><td>8</td></tr>
<tr><td>ORDOFCL</td><td>1</td><td>1</td></tr>
</table>

Operators values

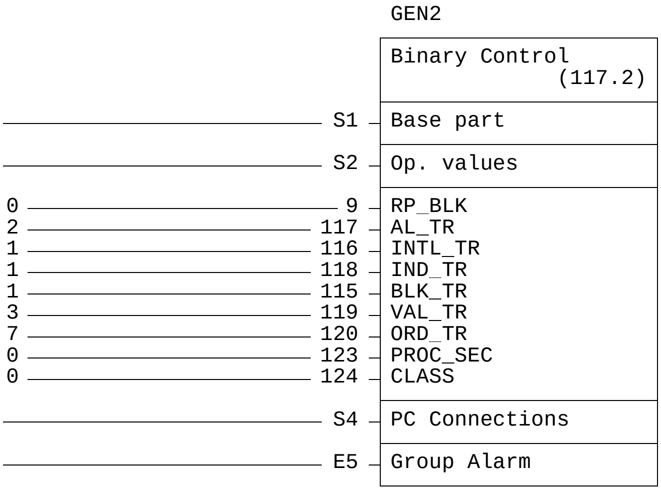


Terminal Description, Operators values (1)

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
101	MVH2	dialog	100.0	R(r/w)	Alarm limit **H2** of **M**easured **V**alue.	–
102	MVH1	dialog	100.0	R(r/w)	Alarm limit **H1** of **M**easured **V**alue.	–
103	MVL1	dialog	0.0	R(r/w)	Alarm limit **L1** of **M**easured **V**alue.	–
104	MVL2	dialog	0.0	R(r/w)	Alarm limit **L2** of **M**easured **V**alue.	–
6	AL_BLK	dialog	0	B(r/w)	**BL**oc**K** **AL**arms and interlocks.	–
					1=event handling of alarms (Connection 21- 26 on GENBIN-I) and limits (Connection 31- 34 on GENBIN-I) is blocked.	
10	EV_BLK	dialog	0	B(r/w)	**BL**oc**K** **EV**ents.	–
					1=event handling of common events (Connection 11- 16 and 41- 42 on GENBIN-I) is blocked.	
8	PR_BLK	dialog	0	B(r/w)	**BL**oc**K** **PR**inter.	–

(1) The texts in the column “Description and “Remarks” are unique for this manual. They are not included in the manual *PC Elements Advant Controller 400 Series Reference Manual.*

Event treat



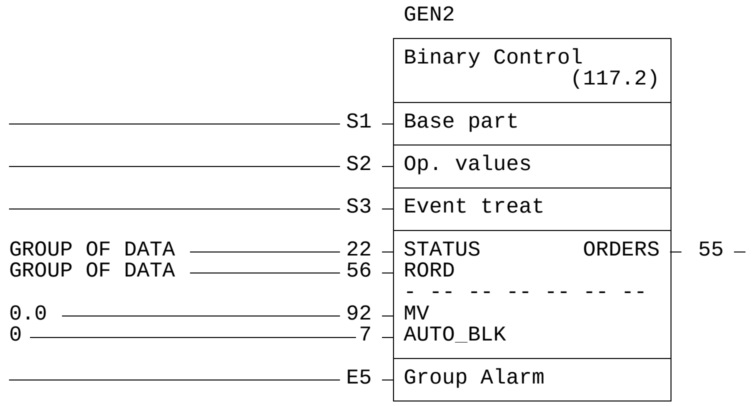
Terminal Description, Event treat

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks
9	RP_BLK	user	0	B(r/w)	**BL**oc**K** **R**e**P**eated alarms.	–
117	AL_TR	user	2	–	**AL**arm **TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of alarms.	–
116	INTL_TR	user	1	–	**INT**er**L**ock **TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of interlocks.	–
118	IND_TR	user	1	–	**IND**ication **TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of indications.	–
115	BLK_TR	user	1	–	**BL**oc**K** **TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of blockings.	The function is not yet implemented in Operator Station.
119	VAL_TR	user	3	–	**VAL**ue **TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of numerical values from dialog.	The function is not yet implemented in Operator Station.

Terminal Description, Event treat (Continued)

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks
120	ORD_TR	user	7	–	**ORD**er **TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of manual orders**.**	The function is not yet implemented in Operator Station.
123	PROC_SEC	user	0	I(r/w)	**PROC**ess **SEC**tion is used for sectioning the alarm handling. Section numbers 1-16.	0=no sectioning. The signal may be presented in lists –1=the signal cannot be selected and cannot be presented in lists.
124	CLASS	user	0	I(r/w)	**CLASS** subdivides process section. Used by status list function in Operator Station.	–

PC Connections



Terminal Description, PC Connections

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks
22	STATUS	PC	–	IL(r/w)	Group of data to be connected to the PC element, GENBIN-I, connection **STATUS**.	–
55	ORDERS	dialog	–	IL(r/w)	Group of data to be connected to the PC element, GENBIN-O, connection **ORDERS**.	–
56	RORD	PC	–	I(r/w)	Group of data to be connected to the PC element, GENBIN-O, connection **RORD**.	–

Terminal Description, PC Connections (Continued)

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
92	MV	PC	0.0	R(r/w)	**M**easured **V**alue.	–
7	AUTO_BLK	PC	0	B(r/w)	**AUTO BL**oc**K** alarms and interlocks.	–

3.6 Operator Functions

The operator functions are divided in principle into 4 parts:

- Presentation
- Dialog
- Event handling
- Group alarm

3.6.1 Presentation

Display elements that can be used for different display types are available for use in the functional unit GENBIN.

The display elements show the status and the controls of the process with different degrees of detail and is intended for the following displays:

- Object display
- Group display
- Object closeup display
- Process display

Examples of different display elements which could be used in these displays are given in the following section. A complete list of the prepared elements available is provided in the manual *AdvaCommand User Interface Reference Manual*.

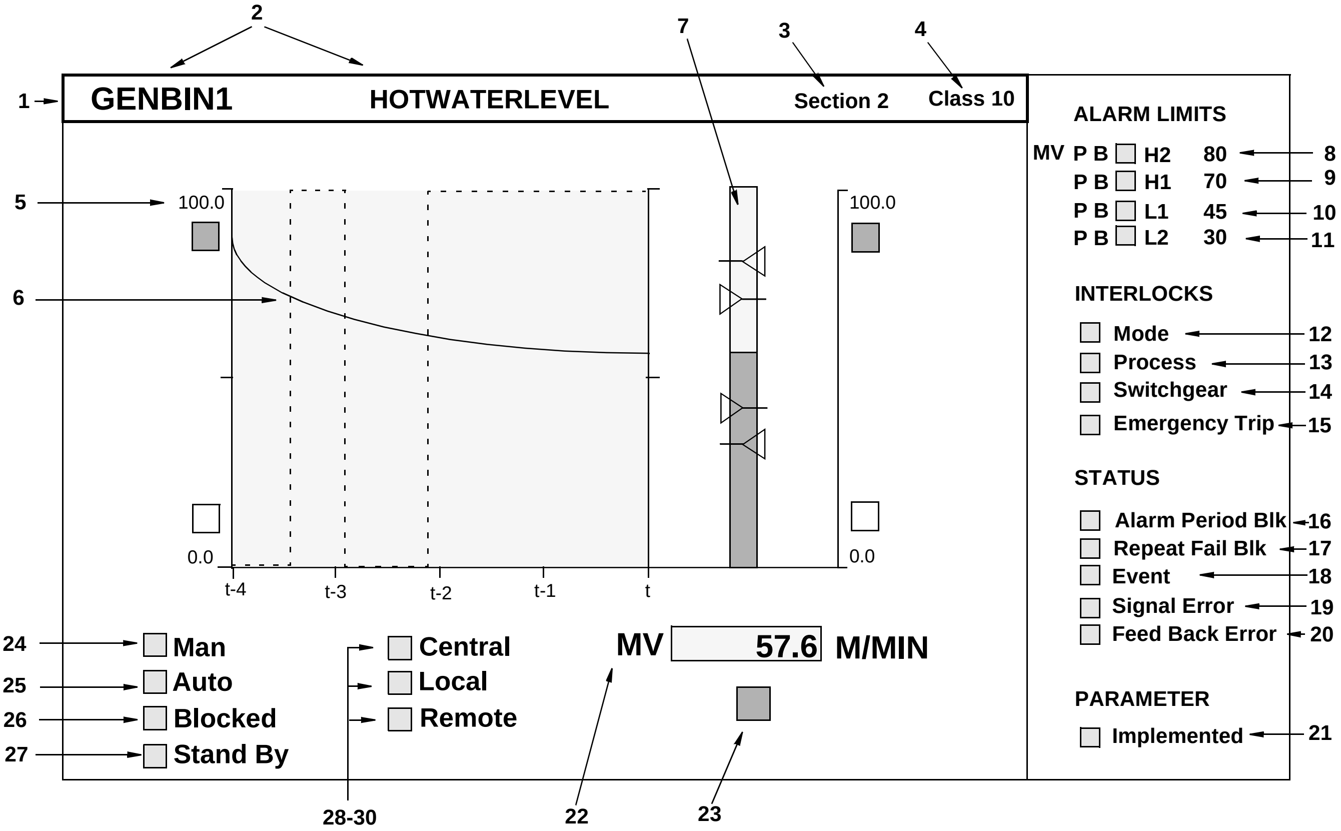
Detailed information of alternative way of presentation of certain status and data within the displays such as colour, flashing, blocked etc is given in the reference manual.

Time-logged Properties

Measured values stored can be presented graphically in the form of curves on the display screen. Such a display, a **trend display**, can consist of 1-4 curves. For the functional unit GENBIN the following value can be logged and presented:

Measured value	MV

Object display: GBIOB01



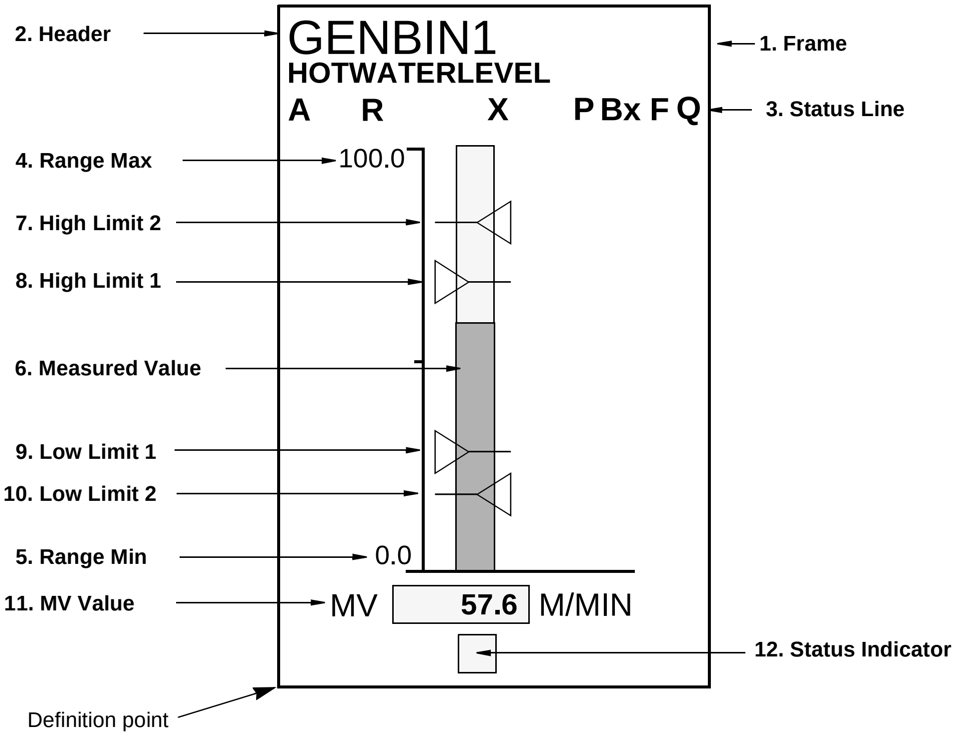
No	Description	Remarks
1	SelectFrame	
2	Header	Object name and description
3.1	Section Text	
3.2	Section Value	Process section
4.1	Class Text	
4.2	Class Value	Object class
5	Range Max	Range Max of the MV value
	Range Min	Range Min of the MV value
6	Measure Value Trim Curve	Object measure value
	Status Indication	
7.1	Measured Value Bargraph	
7.2	High Limit 2	Alarm High limit 2
7.3	High Limit 1	Warning High limit 1

No	Description	Remarks
7.4	Low Limit 1	Warning Low limit 1
7.5	Low Limit 2	Alarm Low limit 2
8	ALARM LIMITS for MV	
8.1	Printout blocked	
8.2	Alarm blocked	
8.3	Alarm Indication	
8.4	H2 Text	
8.5	H2 Value	High limit 2 value
9.1	Printout blocked	
9.2	Alarm blocked	
9.3	Warning Indication	
9.4	H1 Text	
9.5	H1 Value	High limit 1 value

No	Description	Remarks
10.1	Printout blocked	
10.2	Alarm blocked	
10.3	Warning Indication	
10.4	L1 Text	
10.5	L1 Value	Low limit 1 value
11.1	Printout blocked	
11.2	Alarm blocked	
11.3	Alarm Indication	
11.4	L2 Text	
11.5	L2 Value	Low limit 2 value
12	INTERLOCKS	
12.1	Mode Interlock Indication	
12.2	Mode Interlock Text	
13.1	Process Interlock Indication	
13.2	Process Interlock Text	
14.1	Switchgear Interlock Indication	
14.2	Switchgear Interlock Text	
15.1	Emergency Trip Interlock Indication	
15.2	Emergency Trip Interlock Text	
16	STATUS	
16.1	Alarm Period Block Indication	
16.2	Alarm Period Block Text	
17.1	Repeat Fail Block Indication	
17.2	Repeat Fail Block Text	
18.1	Event Indication	
18.2	Event Text	

No	Description	Remarks
19.1	Signal Error Indication	
19.2	Signal Error Text	
20.1	Feed Back Error Indication	
20.2	Feed Back Error Text	
21	PARAMETER	
21.1	Implemented Indication	
21.2	Implemented Text	
22	Measured Value	
22.1	MV	The MV object value
22.2	MV Value	
22.3	MV Unit	
23	Status Indication	Square indication
24.1	Man Indication	Manual mode
24.2	Man text	
25.1	Auto Indication	Auto mode
25.2	Auto text	
26.1	Blocked Indication	Blocked mode
26.2	Blocked text	
27.1	Stand By Indication	Stand By mode
27.2	Stand By text	
28.1	Central Control Indication	
28.2	Central Control Text	
29.1	Local Control Indication	
29.2	Local Control Text	
30.1	Remote Control Indication	
30.2	Remote Control Text	

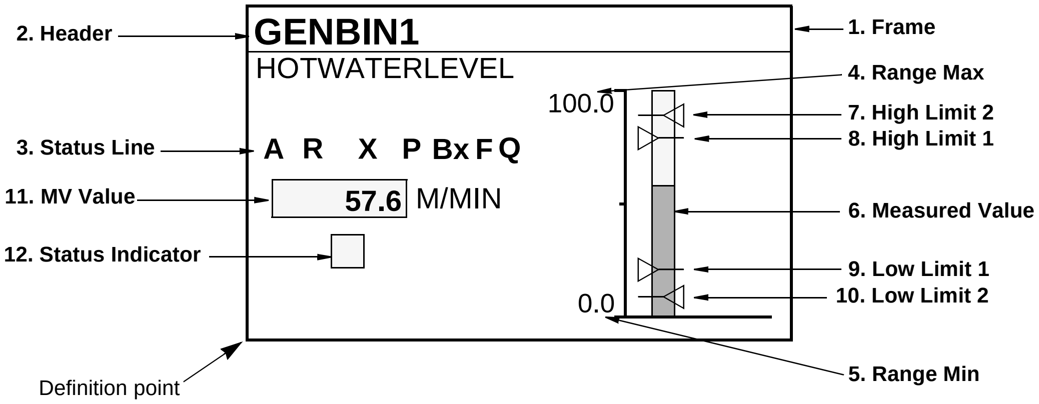
Display Element for Group display: GBIGR01



No	Description	Remarks
1	SelectFrame	
2	Header	Object name and description
3	Status Line	
3.1	Mode	
3.2	Operator Position	
3.3	Interlock Indication	
3.4	Printout Blocked	
3.5	Alarm Blocked	
3.6	Alarm Indication	
3.7	Signal Error Indication	
4	Range Max	Range Max of the MV values

No	Description	Remarks
5	Range Min	Range Min of the MV values
6	Measured Value Bargraph	
7	High Limit 2	Alarm High limit 2
8	High Limit 1	Warning High limit 1
9	Low Limit 1	Warning Low limit 1
10	Low Limit 2	Alarm Low limit 2
11	Measured Value	The MV object value
11.1	MV	
11.2	MV Value	Measured value
11.3	MV Unit	
12	Status Indication	Square indication

Display Element for Object closeup display: GBIWI01

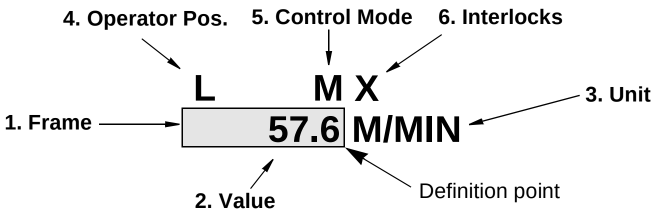


No	Description	Remarks
1	SelectFrame	
2	Header	Object name and description
3	Status Line	
3.1	Mode	
3.2	Operator Position	
3.3	Interlock Indication	
3.4	Printout Blocked	
3.5	Alarm Blocked	
3.6	Alarm Indication	
3.7	Signal Error Indication	
4	Range Max	Range Max of the MV values

No	Description	Remarks
5	Range Min	Range Min of the MV values
6	Measured Value Bargraph	
7	High Limit 2	Alarm High limit 2
8	High Limit 1	Warning High limit 1
9	Low Limit 1	Warning Low limit 1
10	Low Limit 2	Alarm Low limit 2
11	Measured Value	The MV object value
11.1	MV	
11.2	MV Value	Measured value
11.3	MV Unit	
12	Status Indication	Square indication

Display Element for Process display:

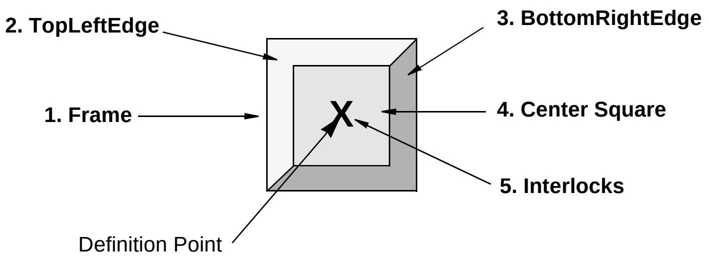
GBIPD01



No	Description	Remarks
1	SelectFrame	
2	Measured Value	
3	Unit	

No	Description	Remarks
4	Operator Position	
5	Mode	
6	Interlocks	Object interlock

GBIPD02



No	Description	Remarks
1	SelectFrame	
2	TopLeftEdge	
3	BottomRightEdge	

No	Description	Remarks
4	Center Square	
5	Interlocks	

3.6.2 Dialog

The display screen is supplemented with a keyboard for operator communication with the functional unit/object.

The dialog is built up using both fixed and dynamic keys. The functions available with the dynamic keys are presented in a pattern of rectangles on the lower part of the display screen when the object is selected. The functional unit GENCON has a MIN dialog (Production level) and a MAX dialog (Maintenance level).

The MIN dialog consists of an output dialog with 1 subdialog. The MAX dialog consists of an output dialog with 3 subdialogs.

MIN dialog (No authority key)

Keyboard keys

Man	**Man**	Set to manual mode
Auto	**Auto**	Set to automatic mode
◇	**On**	Set to open order
▽	**Off**	Set to close order
✓	**Acknowledge**	Acknowledge alarm
Object	**Object Display**	Select Object Display
📈	**Object Trend**	Select Object Trend
Dialog	**Previous Level**	Select Top Level dynamic keys

Dynamic keys, Top Level

D1 Central	D2 Local	D3 Remote	D4 Standby	D5 Blocked
D6	D7	D8	D9	D10 *Keyboard…*

Central	Set to Central control mode
Local	Se to Local control mode
Remote	Set to Remote control mode
Standby	Set to Standby control mode
Blocked	Set to Blocked control mode
Keyboard…	Select Dynamic keys: Keyboard

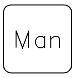
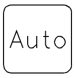
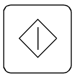
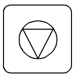
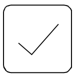
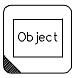
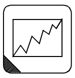
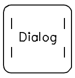
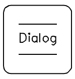
Dynamic keys, Keyboard

D1 ■ On	D2 Man	D3 Auto	D4	D5
D6 □ Off	D7 Acknowledge	D8 Object Display	D9 Object Trend	D10

On	Set to open order
Man	Set to manual mode
Auto	Set to automatic mode
Off	Set to close order
Acknowledge	Acknowledge alarm
Object Display	Select Object Display
Object Trend	Select Object Trend

MAX dialog (Authority key)

Keyboard keys

	**Man**	Set to manual mode
	**Auto**	Set to automatic mode
	**On**	Set to open order
	**Off**	Set to close order
	**Acknowledge**	Acknowledge alarm
	**Object Display**	Select Object Display
	**Object Trend**	Select Object Trend
	**Previous Level**	Select Top Level dynamic keys
	**Next Block**	Page between the dynamic key sets (Keyboard)

Dynamic keys, Top Level

D1 Central	D2 Local	D3 Remote	D4 Standby	D5 Blocked
D6	D7	D8 *Block…*	D9 *Limits…*	D10 *Keyboard…*

Central	Set to Central control mode
Local	Se to Local control mode
Remote	Set to Remote control mode
Standby	Set to Standby control mode
Blocked	Set to Blocked control mode
Block…	Select Dynamic keys: Block
Limits…	Select Dynamic keys: Limits
Keyboard…	Select Dynamic keys: Keyboard

Dynamic keys, Keyboard

D1 ■ On	D2 Man	D3 Auto	D4	D5
D6 □ Off	D7 Acknowledge	D8 Object Display	D9 Object Trend	D10

On	Set to open order
Man	Set to manual mode
Auto	Set to automatic mode
Off	Set to close order
Acknowledge	Acknowledge alarm
Object Display	Select Object Display
Object Trend	Select Object Trend

Dynamic keys, Block…

D1 Block Alarm	D2 Block Printout	D3 Block Event	D4	D5
D6 Deblock Alarm	D7 Deblock Printout	D8 Deblock Event	D9	D10

Block Alarm	Block alarm indication
Block Printout	Block event printout
Block Event	Block event indication
Deblock Alarm	Deblock alarm indication
Deblock Printout	Deblock event printout
Deblock Event	Deblock event indication

Dynamic keys, Limits…

D1 H1 70	D2 H2 80	D3	D4	D5
D6 L1 45	D7 L2 30	D8	D9	D10

H1	Check/change measured value warning limit H1
H2	Check/change measured value alarm limit H2
L1	Check/change measured value warning limit L1
L2	Check/change measured value alarm limit L2

Variation possibilities

A certain variation possibility is available in both dialog by using VALALWD and ORDALWD which are included in the data base element. They can be used to block individual orders and numerical values in the dialogs. See data base element population as described in Section 3.5 Data Base Element GENBIN. Note that the blocked dynamic key remains in the dialog. If a blocked key is depressed, an error message is presented on the error message line and the command is not executed. Text on the dynamic function keys can be changed however by editing in a specific static display. When editing, the dialog text for all instances of the reftype to which the dialog belongs is changed.

3.6.3 Event Handling

The event handling detects changes in the STATUS word and other status signals.

All of these possible alarms and events are separated into groups.

A reference, an Event Treat pointer, is provided in the data base element for each of these groups. The event handling can locate, via this reference, the place in its own data base which discribes the procedures to be followed in the case of the current event/alarm. The events associated with the different Event Treat pointers are shown in the table below. Here are also shown the standard texts for the default values on the Event Treat pointers and which pointers each event produces if the user wants to define his own event texts.

This is explained in further detail in the manual *AdvaCommand Basic Functions User's Guide*.

Table 3-1. Event Texts for GENBIN

Events	**Event Treat pointer**	**Property text**		**Event text**	
		Standard text	**Line No in Event Treat**	**Standard text**	**Line No in Event Treat**
Signal error On	AL_TR	SignErr	1	Alarm	1
Signal error Off	AL_TR	SignErr	1	Normal	2
Feedback error On	AL_TR	FBErr	2	Alarm	1
Feedback error Off	AL_TR	FBErr	2	Normal	2
Upper limit H2 for measured value exceeded	AL_TR	MV>H2	5	Alarm	1
Upper limit H2 for measured value re-entered	AL_TR	MV>H2	5	Normal	2
Upper limit H1 for measured value exceeded	AL_TR	MV>H1	6	Alarm	1
Upper limit H1 for measured re-entered	AL_TR	MV>H1	6	Normal	2
Lower limit L1 for measured value exceeded	AL_TR	MV<L1	7	Alarm	1
Lower limit L1 for measured value re-entered	AL_TR	MV<L1	7	Normal	2
Lower limit L2 for measured value exceeded	AL_TR	MV<L2	8	Alarm	1
Lower limit L2 for measured value re-entered	AL_TR	MV<L2	8	Normal	2
Op. mode Interlock INTMODE On	INTL_TR	ModeIntl	1	On	1
Op. mode Interlock INTMODE Off	INTL_TR	ModeIntl	1	Off	2

Table 3-1. Event Texts for GENBIN (Continued)

Events	**Event Treat pointer**	**Property text**		**Event text**	
		Standard text	**Line No in Event Treat**	**Standard text**	**Line No in Event Treat**
Process Interlock INTPROC On	INTL_TR	ProcIntl	2	On	1
Process Interlock INTPROC Off	INTL_TR	ProcIntl	2	Off	2
Switchgear Interlock INTSWGR On	INTL_TR	SwgrIntl	3	On	1
Switchgear Interlock INTSWGR Off	INTL_TR	SwgrIntl	3	Off	2
Emergency Stop Interlock INTEMTP On	INTL_TR	EmTrpInt	4	On	1
Emergency Stop Interlock INTEMTP Off	INTL_TR	EmTrpInt	4	Off	2
Op. mode Central On	IND_TR	Central	1	On	1
Op. mode Central Off	IND_TR	Central	1	Off	2
Op. mode Local On	IND_TR	Local	2	On	1
Op. mode Local Off	IND_TR	Local	2	Off	2
Op. mode Remote On	IND_TR	Remote	3	On	1
Op. mode Remote Off	IND_TR	Remote	3	Off	2
Op. mode Manual On	IND_TR	Manual	5	On	1
Op. mode Manual Off	IND_TR	Manual	5	Off	2
Op. mode Auto On	IND_TR	Auto	4	On	1
Op. mode Auto Off	IND_TR	Auto	4	Off	2
Op. mode Blocked On	IND_TR	CtrlBlk	6	On	1
Op. mode Blocked Off	IND_TR	CtrlBlk	6	Off	2
Op. mode Standby On	IND_TR	Standby	7	On	1
Op. mode Standby Off	IND_TR	Standby	7	Off	2
ON-indication On	IND_TR	On/Open	9	On	1
ON-indication Off	IND_TR	On/Open	9	Off	2
Indication changing On	IND_TR	PosChnge	10	On	1
Indication changing Off	IND_TR	PosChnge	10	Off	2

Event treat pointers

The pointers can be allocated other values to permit use of own texts and/or remove certain printouts.

If a pointer is set to 0, this means that all event handling of all events associated with the pointer is stopped.

See the manual *AdvaCommand User Interface Reference Manual* for the result of using other references.

AL_TR:

The default value =2, which means alarm when a signal enters alarm condition and event when a signal leaves alarm condition. The printout format is as shown in Figure 3-2

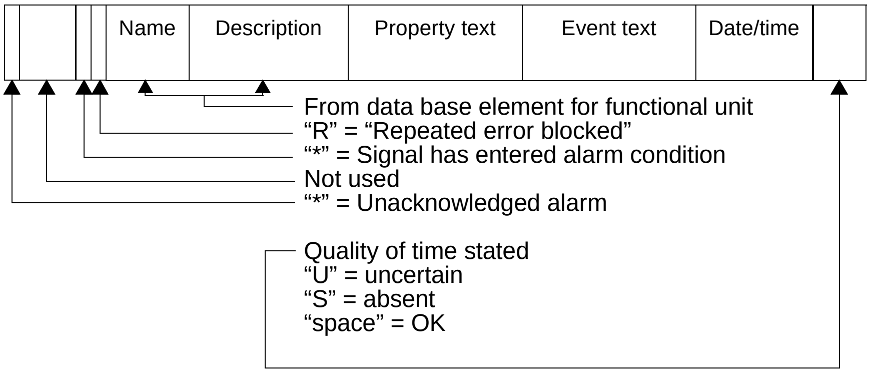

Name
Description
Property text
Event text
Date/time
From data base element for functional unit
“R” = “Repeated error blocked”
“*” = Signal has entered alarm condition
Not used
“*” = Unacknowledged alarm
Quality of time stated
“U” = uncertain
“S” = absent
“space” = OK

Figure 3-2. Format of printout in alarm and event list

```
* SF *   M353.12        High Pressure Pump             Sign Error      Alarm          94-11-17 12:38:03:990
```

Figure 3-3. Printout from an AI-error

INTL_TR:

Default value=1 which means event when an interlock is coming and when it dissapears. The format of the printout is the same as for AL_TR.

IND_TR:

Default value=1 which means event when an indication changes value. The format of the printout is the same as for AL_TR.

Alarm handling

One of the groups described in the section about Event handling can be handled as an alarm. The corresponding Event Treat pointer is designated AL_TR.

The following signals are included:

- ALSIGNE - signal error.
- ALFBE - feed back error.
- ALLIMH2, ALLIMH1, ALLIML1 and ALLIML2 - the measured value has passed the corresponding limit.

Blocking function

Alarm and event handling can be blocked from

- The dialog
- The data base element (configuration parameters).
- The control program

Blocking from the dialog sets one or several of the flags AL_BLK, EV_BLK and PR_BLK in the data base element. I.e. displays, lists and printouts can be blocked with respect to alarms and events included in the groups AL_TR, INTL_TR and IND_TR.

Blocking from the dialog is indicated in the displays with a B or with a square in front of an explanatory text.

Blocking from the data base element can be performed by setting a zero on the corresponding EVENT TREAT pointer. No indiction of this is given on the displays.

Default values can also be given to the flags AL_BLK, EV_BLK and PR_BLK. These will however be written over by the dialog.

Blocking in this way is indicated in the displays in the same way as blocking from the dialog.

Blocking from the control program is made in a conven-tional way with help of logic elements, switches etc. If indication in displays is wished the blocking control signal should also be connected to data base element connection AUTO_BLK.

3.6.4 Group Alarm

It is possible to connect the functional unit GENBIN to the group alarm function. This function makes it possible to gather alarms and events from related process signals and objects into Alarm Groups. These groups are then treated as objects.

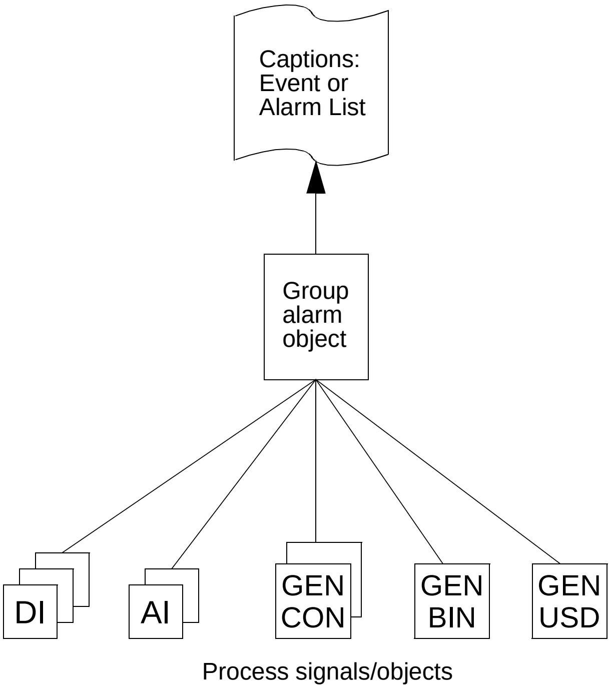


Figure 3-4. Group Alarm

The group alarm function consists of four parts as follows:

- Grouping of process alarms and events.
- Blocking of groups
- Automatic acknowledgement
- External alarm outputs

For a more detailed description of the group alarm function, reference is made to the manual *AdvaCommand Basic Functions User’s Guide*.

3.7 Application Example

As mentioned above, the PC program is user defined. This means that the user is responsible for both the control-technique and the connection to the data base.

An example of how the different properties in the data base element can be utilized and how a simple control function can be implemented is shown in Figure 3-4. Note in particular that the connection to the data base element is either direct or via the PC elements GENBIN-O and GENBIN-I.

3.7.1 PC Program Example

Figure 3-5 and Figure 3-6 shows a simple motor control unit built up with the functional unit GENBIN and standard Advant Controller 410/450 library functions.

The motor is always in the MAN control mode and is controlled from a central operator's console.

Of the two operation conditions RUN_COND1 requires immediate restart whereas RUN_COND2 requires restart only if the condition persists longer than 5 secs. There is also a start condition which must be satisfied for it to be possible to start the motor. Alarm checks are performed on three signal errors and one feedback error. When the GENBIN data bas element is populated, ORDALWD should be set to H'0180 and VALAWD to H'0000 to block orders not used in the PC program.

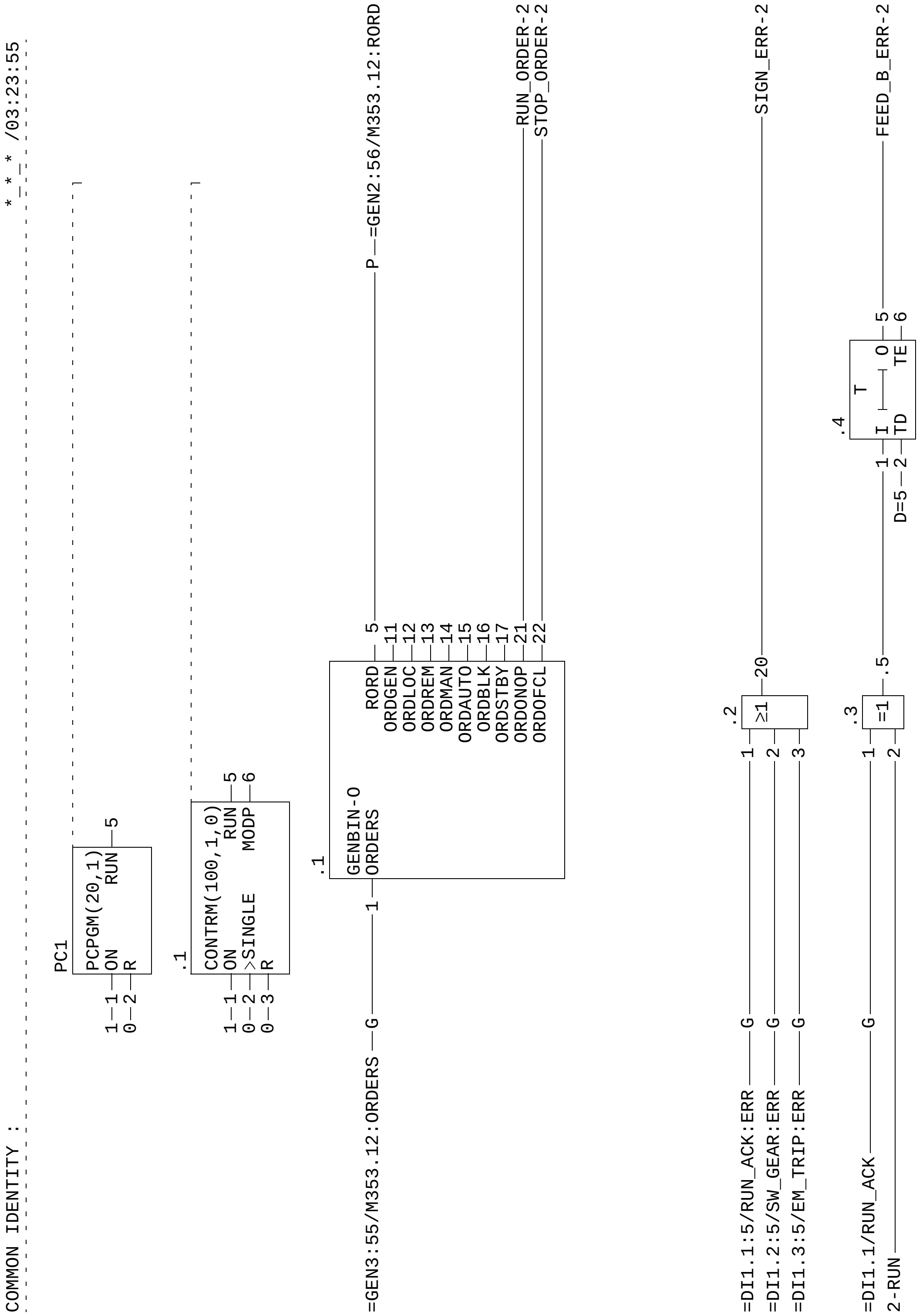


Figure 3-5. PC program example

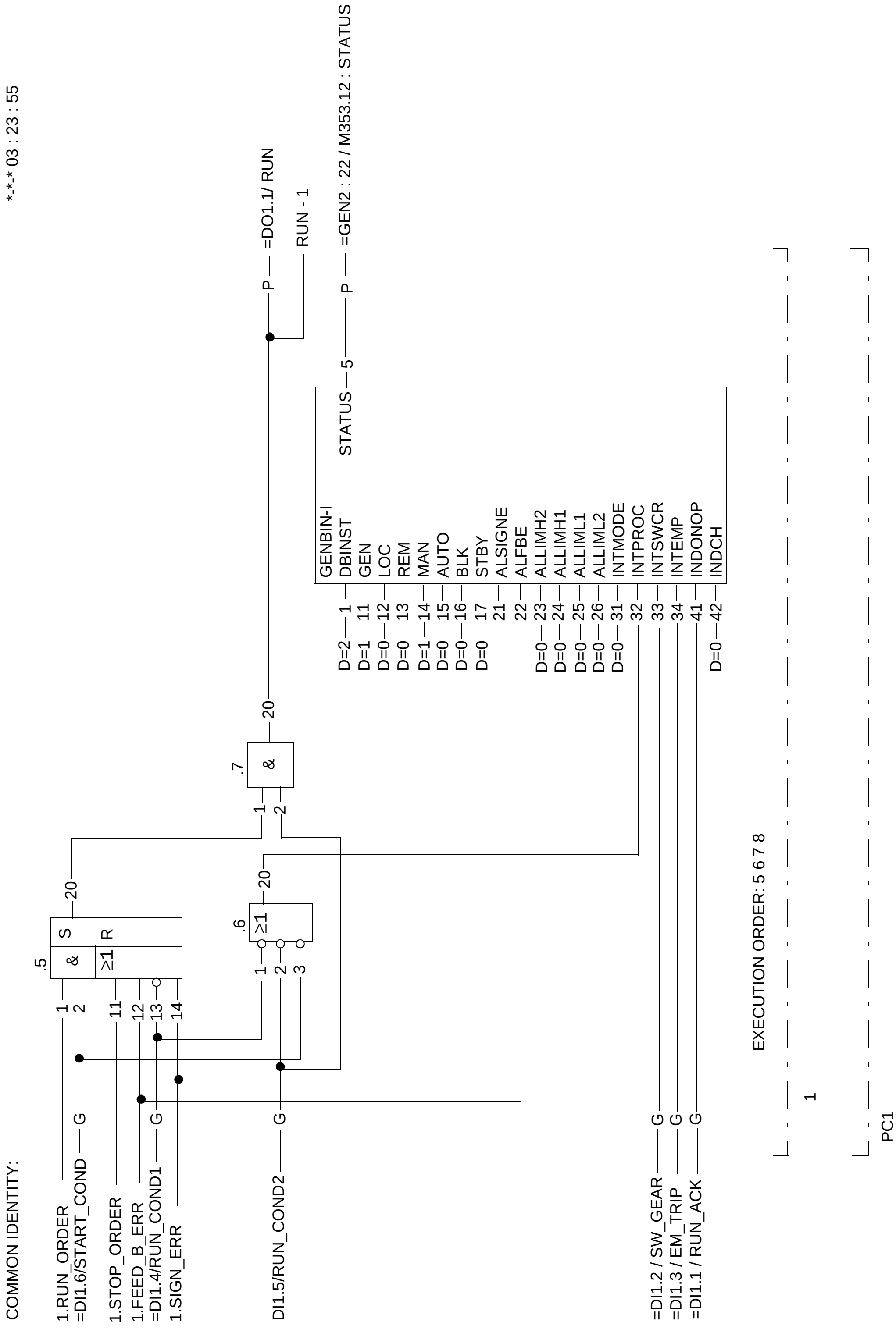


Figure 3-6. PC program example

Chapter 4 GENUSD

4.1 General

The user defined functional unit GENUSD is included in a group of functional units which supplement the ABB Advant Controller 400 Series function libraries and permit simplified implementation of process instrumentation functions.

Characteristic of these units is that their operation is adapted to standardized functions in the operator station.

GENUSD, by virtue of its design, with a user-defined PC program, coupled via special PC elements to the operator functions of the functional unit, is suitable for use in both simpler and more sophisticated control operations.

Summarizing, the following functions and properties are of special importance:

- User defined control function
- General displays and dialogs

4.2 Configuration

The user defined functional unit GENUSD consists of 4 parts:

1. A user defined PC program which solves the con-trol algorithm. This program is an assembly of Advant Controller 410/450 PC elements.
2. Two PC elements which function as interfaces for logical signals between the PC program and the data base. These PC elements are handled in the same way as other PC elements in the Advant Controller 410/450 products.
3. A section for operator functions which consists of both presentation and dialog functions. Parameters and data from the process are presented on the display screen. A keyboard on which the operator can change e.g. set point and operation mode is used for the dialog. The results of the operator’s control actions are presented on the display screen. The application work for this part is limited, as standard, to display disposition.
4. A data base element with configuration constants and dynamic data which constitute an interface to the operator functions.

Figure 4-1 illustrates the relationship between these parts.

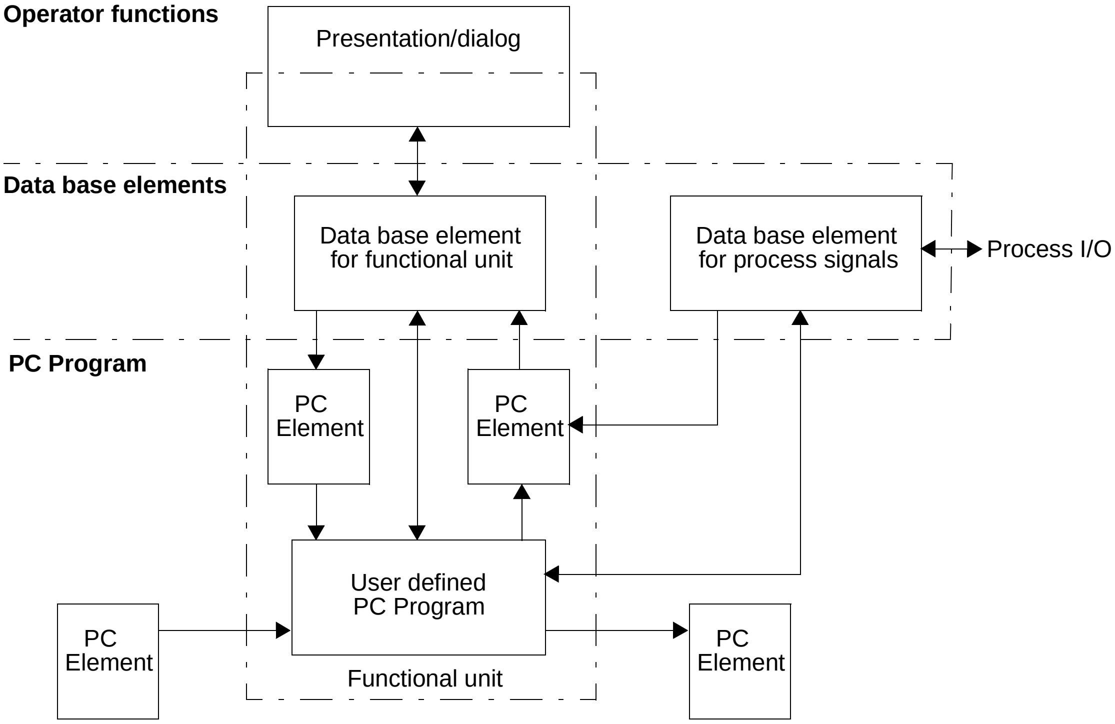


Figure 4-1. Functional Unit, Principle diagram

4.3 Function

Though GENUSD is a general tool which enables the user to create desired control functions, it is not possible as it is for other functional units outside the GENXXX family, to give a control function orientated description. The possibilities given with GENUSD are instead described with connection descriptions for PC elements and data base elements.

4.4 PC Elements

The PC elements GENUSD-O (GENeral object USer Defined controller Order element) and GENUSD-I (GENeral object USer Defined controller Indication element) are used as interfaces for logical signals between the user defined PC program and the data base element.

These data sheets are included in the manual *PC Elements Advant Controller 400 Series Reference Manual* in which all of the elements included in the Advant Controller 410/450 products are available.

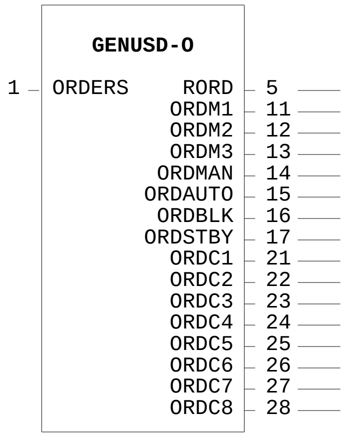
4.4.1 PC Element GENUSD-O

User Defined Functional Unit, Outputs GENUSD-O

Summary

GENUSD-O (**GEN**eral **US**er **D**efined functional unit **-** **O**utputs) is used as an interface for binary signals between Advant Station 500 OS and the user’s PC program via the data base element. The element forms part of the functional unit GENUSD.

Call GENUSD-O



PC element GENUSD-O

Terminal Description

No	Name	Type	Description
1	ORDERS	IIL	Connection to ORDERS on the data base element for reading the values at the order outputs.
5	RORD	OI	**R**eset **ORD**er. Connection to RORD on the data base element to obtain pulsed outputs.
11	ORDM1	OB	**ORD**er output operator position **M1**. Ordering of operator position M1.
12	ORDM2	OB	**ORD**er output operator position **M2**. Ordering of operator position M2.
13	ORDM3	OB	**ORD**er output operator position **M3**. Ordering of operator position M3.
14	ORDMAN	OB	**ORD**er output **MAN**ual mode. Ordering of manual control.
15	ORDAUTO	OB	**ORD**er output **AUTO** mode. Ordering of automatic operation.
16	ORDBLK	OB	**ORD**er output **BL**oc**K**ed mode. Ordering of blocking.
17	ORDSTBY	OB	**ORD**er output **ST**and **BY** mode. Ordering of standby.
21	ORD*C1*	OB	**ORD**er output ***C1***.
22	ORD*C2*	OB	**ORD**er output ***C2***.
23	ORD*C3*	OB	**ORD**er output ***C3***.
24	ORD*C4*	OB	**ORD**er output ***C4***.
25	ORD*C5*	OB	**ORD**er output ***C5***.

Terminal Description

No	Name	Type	Description
26	ORD*C6*	OB	**ORD**er output ***C6***.
27	ORD*C7*	OB	**ORD**er output ***C7***.
28	ORD*C8*	OB	**ORD**er output ***C8***

4.4.1.1 Outputs to PC Program

The Boolean terminals on the element are order outputs. These terminals are connected to other PC elements in the user defined PC program to permit the transmission of orders from the dialog to the PC. The terminals on the element adapt the values in ORDERS in the data base element. If more than one bit in orders is set to 1 priorities in accordance with the following are obtained at the outputs.

Only one of the terminals ORDM1, ORDM2 and ORDM3 can be set to 1.

The priorities are so established that the first (in accordance with their listing on the PC element) order output, which corresponding ORDERS-bit is 1 is setto 1, the other two are set to 0. The outputs ORDMAN, ORDAUTO, ORDBLK and ORDSTBY are processed in the same way as ORDM1, ORDM2 and ORDM3. The outputs ORDC1--ORDC6 are given no priority.

4.4.1.2 Connection to Data Base Element

The input ORDERS is connected to ORDERS in the data base element. Values from the order section of the dialog are stored in ORDERS.

The element has one output, RORD, to the data base element. The output RORD (Reset ORDer) is used to determine if the order outputs are pulsed or static outputs. When RORD is connected to the data base element, one output is cleared immediately after it has been set, this resulting in pulsed outputs. If RORD is not connected to the data base element, the outputs are not automatically cleared. It is not possible to have an output or a group of outputs as pulsed outputs and the others as static.

Please observe, that the terminal RORD **must** be connected to the data base element.

Also observe that the PC program writes and reads **real values** in the data base element directly.

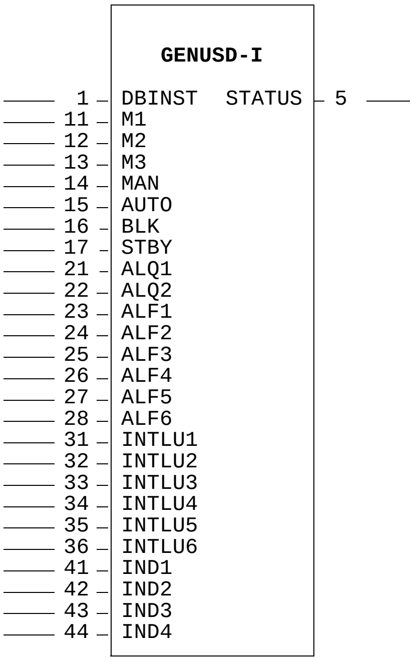
4.4.2 PC Element GENUSD-I

User Defined Functional Unit, Inputs GENUSD-I

Summary

GENUSD-I (**GEN**eral **US**er **D**efined functional unit **- I**nputs) is used as an interface for binary signals between the user's PC program and the Advant Station 500 series OS via data base element. The element forms part of the functional unit GENUSD.

Call - GENUSD-I



PC element GENUSD-I

Terminal Description

No	Name	Type	Description
1	DBINST	II	**D**ata **B**ase **INST**ance. An operational parameter or a constant, defining the instance number of the data base element (to be defined in its header). Alternatively, a connection to the data base element.
5	STATUS	OIL	Connection to STATUS on the data base element for writing the values at the indication inputs.
11	M1	IB	Operator position indication **M1**. Indication of operator position M1.
12	M2	IB	Operator position indication **M2**. Indication of operator position M2.
13	M3	IB	Operator position indication **M3**. Indication of operator position M3.
14	MAN	IB	Operation mode indication **MAN**ual. Indication of manual operation.
15	AUTO	IB	Operation mode indication **AUTO**. Indication of automatic operation.

Terminal Description

No	Name	Type	Description
16	BLK	IB	Operation mode indication **BL**oc**K**ed. Indication of blocking.
17	STBY	IB	Operation mode indication **ST**and **BY**. Indication of standby.
21	ALQ1	IB	**AL**arm indication **Q1**. Alarm indication, signal fault 1.
22	ALQ2	IB	**AL**arm indication **Q2**. Alarm indication, signal fault 2.
23	ALF1	IB	**AL**arm indication **F1**. Alarm indication, fault 1.
24	ALF2	IB	**AL**arm indication **F2**. Alarm indication, fault 2.
25	ALF3	IB	**AL**arm indication **F3**. Alarm indication, fault 3.
26	ALF4	IB	**AL**arm indication **F4**. Alarm indication, fault 4.
27	ALF5	IB	**AL**arm indication **F5**. Alarm indication, fault 5.
28	ALF6	IB	**AL**arm indication **F6**. Alarm indication, fault 6.
31	INTLU1	IB	**INT**er**L**ock indication **U1**. Indication of interlock U1.
32	INTLU2	IB	**INT**er**L**ock indication **U2**. Indication of interlock U2.
33	INTLU3	IB	**INT**er**L**ock indication **U3**. Indication of interlock U3.
35	INTLU5	IB	**INT**er**L**ock indication **U5**. Indication of interlock U5.
34	INTLU4	IB	**INT**er**L**ock indication **U4**. Indication of interlock U4.
36	INTLU6	IB	**INT**er**L**ock indication **U6**. Indication of interlock U6.
41	IND1	IB	**IND**ication **1**
42	IND2	IB	**IND**ication **2**
43	IND3	IB	**IND**ication **3**
44	IND4	IB	**IND**ication **4**

4.4.2.1 Inputs from PC Program

The Boolean terminals on the element are indication inputs. These terminals can be connected to outputs on PC elements in the user defined PC program. A change in one or several indications are designated an event. An event is reported to the operator station for any event printout necessary and for presentation in displays.

4.4.2.2 Connection to Data Base Element

The input DBINST is connected to the data base element. DBINST holds information about which instance number the functional unit has in the data base.

The element has one output, STATUS, to the data base element. The output STATUS is connected to STATUS in the data base element. The indictions are sent, in STATUS, up to the data base element for further presentation in operator functions.

Please observe that the PC program writes and reads **real values** in the data base element directly.

4.5 Data Base Element GENUSD

Information about the data base element in the functional unit GENUSD is given in data sheet form. This data sheet is included in the manual *Data Base Elements Advant Controller 400 Series Reference Manual* in which all of the data base elements included in the Advant Controller 410/450 products are assembled.

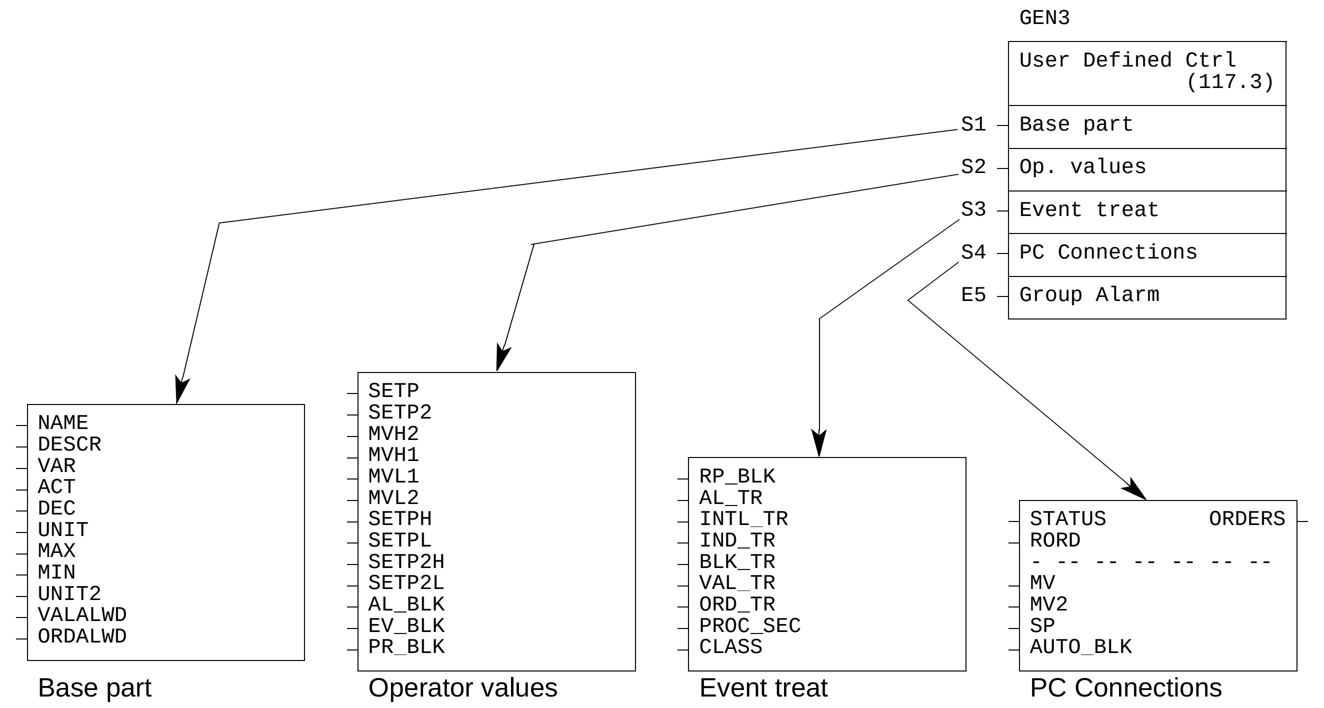
User Defined Ctrl GENUSD

Summary

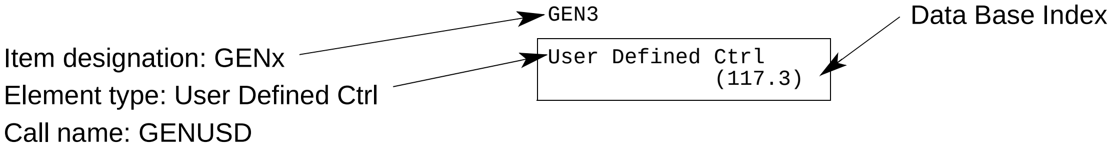
The User Defined Ctrl data base element is used to build up Advant Station 500 Series Operator Station functions for the GENUSD functional unit. Some static information in the displays are given. Parameters which can be changed from dialog can be given start values. The element performs an interface between the PC-program/process function and Advant Station 500 Series Operator Station.

For information about the extension parts of Group Alarm see data base element Group Member.

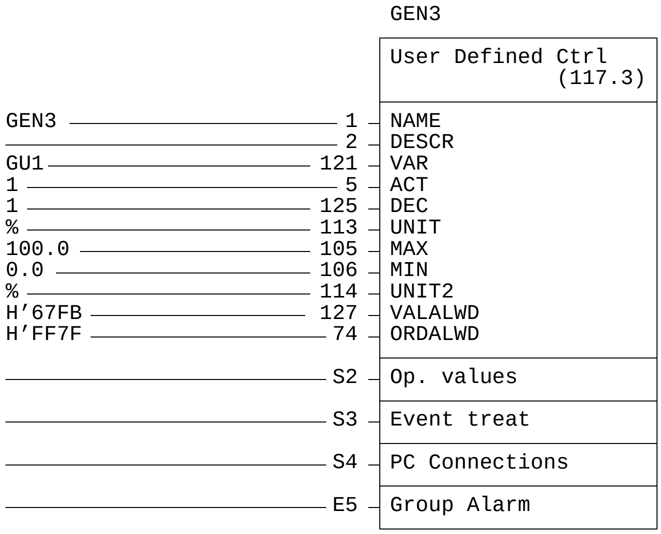
Overview



Head



Base part



Terminal Description, Base part

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
1	NAME	user	GENx	–	Every Controller must have a unique **NAME**. E.g. M353.13.	Max. 20 characters. Spaces are not allowed.
2	DESCR	user	–	–	This **DESCR**iption of the Controller will be shown in Operator Station.	Max. 20 characters. You may enter any information regarding the controller.

Terminal Description, Base part (Continued)

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks
121	VAR	user	GU1	–	**VAR**iant: GU1,.. , GU6 are the variants of GENUSD which can be selected.	GU1, .. , GU6 has the same default dialogs and displays in Operator Station. The user can modify them if needed. For further information, please refer to Advant Station 500 Series Ope–rator Station manuals.
5	ACT	user	1	B(r)	1=the operator communication is **ACT**ive.	0=dialog is blocked and events are not updated.
125	DEC	user	1	–	The number of **DEC**imals for measured value and its alarm limits and for setpoint and rangemin and rangemax.	A total number of 5 figures plus point and sign can be presented. DEC can be 0..4.
113	UNIT	user	%	A6(r)	The **UNIT** of the measured value and setpoint in engineering unit.	Max. 6 characters shown in Operator Station and data base element.
105	MAX	user	100.0	R(r/w)	**MAX**imum value within measuring range.	Used for scaling of bar graph.
106	MIN	user	0.0	R(r/w)	**MIN**imum value within measuring range.	Used for scaling of bar graph.
114	UNIT2	user	%	A6(r)	The **UNIT** of the measured value **2** and setpoint 2 in engineering unit.	Max. 6 characters shown in Operator Station and data base element.

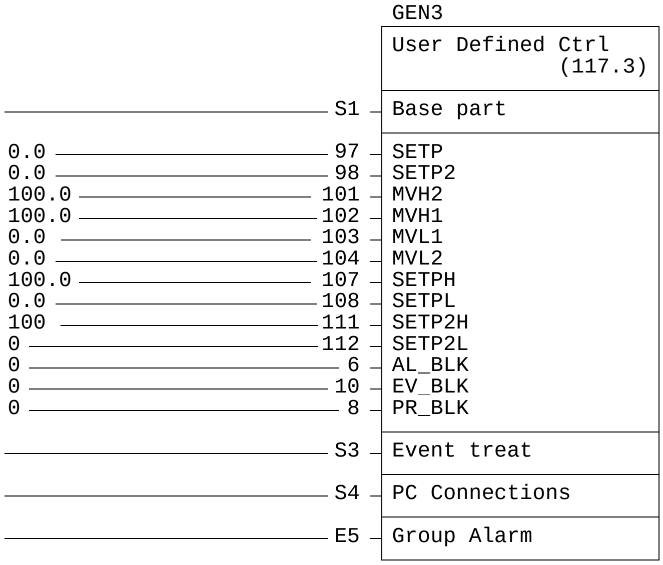
Terminal Description, Base part (Continued)

Termi-nal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks		
						Value	Bit value	Def. Hex. value
127	VALALWD	user	H’67FB	I(r/w)	**VAL**ue **AL**lo**W**e**D**. Group of data consisting of the values which are changable from the dialog. Each available value is represented by a flag in VALALWD. If it is allowed to change a value from the dialog its corresponding flag is set to 1. The default value gives the possibility to change all values that are available from the dialog. How VALALWD is calculated is shown in the table to the right.	SETP	1	B
						SETP2	2	
						MVH2	8	
						MVH1	1	F
						MVL1	2	
						MVL2	4	
						MAX	8	
						MIN	1	7
						SETPH	2	
						SETPL	4	F
						SETP2H	2	6
						SETP2L	4	

Terminal Description, Base part (Continued)

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks		
						Manual order	Bit value	Def. Hex. value
74	ORDALWD	user	H’FF7F	I(r/w)	**ORD**er **AL**lo**W**e**D**. Group of data consisting of the manual orders which are allowed to give from the dialog. Each available order is represented by a flag in ORDALWD. If it is allowed to give an order from the dialog, its corresponding flag is set to 1. The default value gives the possibility to give all orders that are available from the dialog. How ORDALWD is calculated is shown in the table to the right.	ORDM1	1	F
						ORDM2	2	
						ORDM3	4	
						ORDMAN	8	
						ORDAUTO	1	7
						ORDBLK	2	
						ORDSTBY	4	
						ORDC1	1	F
						ORDC2	2	
						ORDC3	4	
						ORDC4	8	
						ORDC5	1	F
						ORDC6	2	
						ORDC7	4	
						ORDC8	8	

Operators values



Terminal Description, Operators values (1)

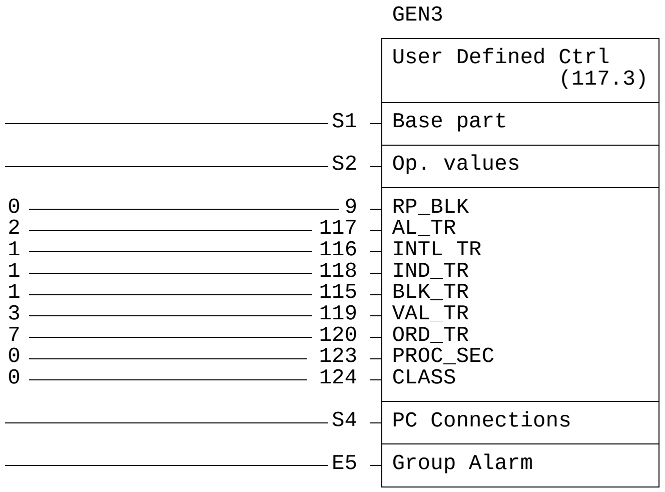
Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
97	SETP	dialog	0.0	R(r/w)	Auto **SETP**oint.	–
98	SETP2	dialog	0.0	IL(r/w)	**SETP**oint integer long.	–
101	MVH2	dialog	100.0	R(r/w)	Alarm limit **H2** of **M**easured **V**alue.	–
102	MVH1	dialog	100.0	R(r/w)	Alarm limit **H1** of **M**easured **V**alue.	–
103	MVL1	dialog	0.0	R(r/w)	Alarm limit **L1** of **M**easured **V**alue.	–
104	MVL2	dialog	0.0	R(r/w)	Alarm limit **L2** of **M**easured **V**alue.	–
107	SETPH	dialog	100.0	R(r/w)	**H**igh limit of auto **SETP**oint.	–
108	SETPL	dialog	0.0	R(r/w)	**L**ow limit of auto **SETP**oint.	–
111	SETP2H	dialog	100	IL(r/w)	**H**igh limit of auto **SETP**oint **2**.	–
112	SETP2L	dialog	0	IL(r/w)	**L**ow limit of auto **SETP**oint **2**.	–
6	AL_BLK	dialog	0	B(r)	**BL**oc**K AL**arms and limitations.	–
					1=event handling of alarms (Connection 21- 28 on GENUSD-I) and limits (Connection 31- 36 on GENUSD-I) is blocked.	

Terminal Description, Operators values (1) (Continued)

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks
10	EV_BLK	dialog	0	B(r/w)	**BL**oc**K** **EV**ents.	–
					1=event handling of common events (Connection 11- 17 and 41- 44 on GENUSD-I) is blocked.	
8	PR_BLK	dialog	0	B(r/w)	**BL**oc**K** **PR**inter.	–

(1) The texts in the column “Description and “Remarks” are unique for this manual. They are not included in the manual *PC Elements Advant Controller 400 Series Reference Manual.*

Event treat



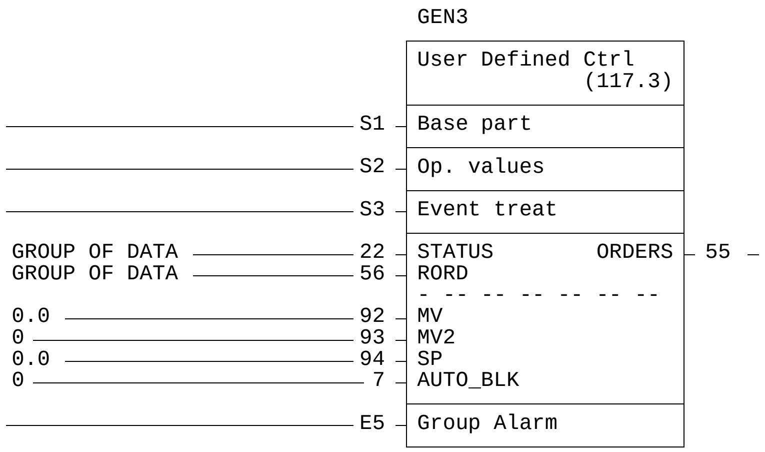
Terminal Description, Event treat

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks
9	RP_BLK	user	0	B(r/w)	**BL**oc**K** **R**e**P**eated alarms.	–
117	AL_TR	user	2	–	**AL**arm **TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of ALarms.	–
116	INTL_TR	user	1	–	**INT**er**L**ock **TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of interlocks.	–

Terminal Description, Event treat (Continued)

Terminal No	Terminal Name	Value entered by	Default value	PC connection data type	Description	Remarks
118	IND_TR	user	1	–	**IND**ication **TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of indications.	–
115	BLK_TR	user	1	–	**BL**oc**K TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of blockings.	The function is not yet implemented in Operator Station.
119	VAL_TR	user	3	–	**VAL**ue **TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of numerical values from dialog.	The function is not yet implemented in Operator Station.
120	ORD_TR	user	7	–	**ORD**er **TR**eat. Pointer to data base element in EVENT_TREAT which defines the event handling in Operator Station of manual orders.	The function is not yet implemented in Operator Station.
123	PROC_SEC	user	0	I(r/w)	**PROC**ess **SEC**tion is used for sectioning the alarm handling. Section numbers 1-16.	0=no sectioning. The signal may be presented in lists –1=the signal cannot be selected and cannot be presented in lists.
124	CLASS	user	0	I(r/w)	**CLASS** subdivides process section. Used by status list function in Operator Station.	–

PC Connections



Terminal Description, PC Connections

Termi-nal No	Terminal Name	Value entered by	Default value	PC con-nection data type	Description	Remarks
22	STATUS	PC	–	IL(r/w)	**STATUS**. Group of data to be connected to the PC element. GENUSD-I, connection **STATUS**.	–
56	RORD	PC	–	I(r/w)	**RORD**. Group of data to be connected to the PC element, GENUSD-O, connection **RORD**.	–
92	MV	PC	0.0	R(r/w)	**M**easured **V**alue.	–
93	MV2	PC	0	IL(r/w)	**M**easured **V**alue **2**.	–
94	SP	PC	0.0	R(r/w)	Working **S**et**P**oint.	–
7	AUTO_BLK	PC	0	B(r/w)	**AUTO BL**oc**K** alarms and interlocks.	–
55	ORDERS	dialog	–	IL(r/w)	**ORDERS**. Group of data to be connected to the PC element. GENUSD-O, connection **ORDERS**.	–

4.6 Operator Functions

The operator functions are divided in principle into 4 parts:

- Presentation
- Dialog
- Event handling
- Group alarm

4.6.1 Presentation

Display elements that can be used for different display types are available for use in the functional unit GENUSD.

The display elements show the status and the controls of the process with different degrees of detail and is intended for the following displays:

- Object display
- Group display
- Object closeup display
- Process display

Examples of different display elements which could be used in these displays are given in the following section. A complete list of the prepared elements available is provided in the manual *AdvaCommand User Interface Reference Manual.*

The contents of the display and the conditions under which it is presented are described in the reference manual.

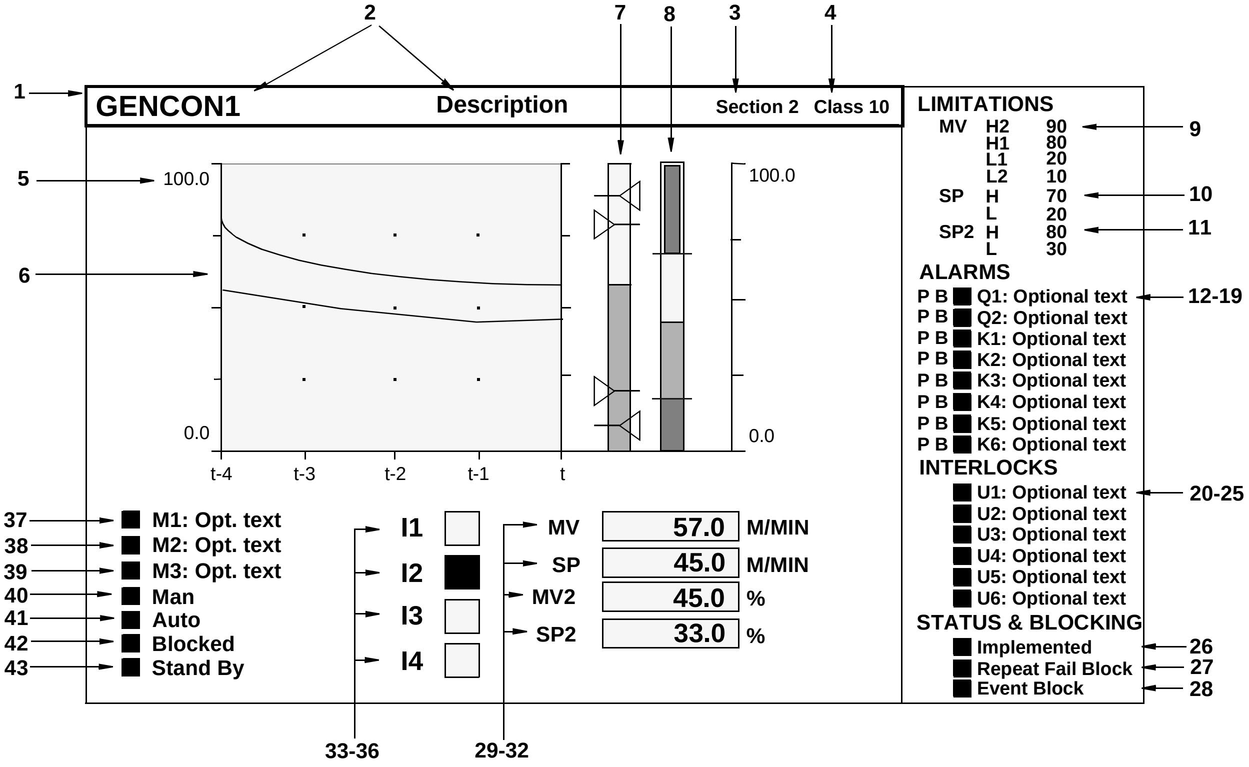
Six variants of GENUSD can be selected with a parameter VARiant in data base element. These variants GU1,....GU6 has the same default dialogs and displays in Advant Station 500 Series Operator Station. The user can modify them if needed. For further information, please refer to the reference manual.

Time-logged Properties

Measured values stored can be presented graphically in the form of curves on the display screen. Such a display, a **trend display**, can consist of 1-4 curves. For the functional unit GENUSD the following values can be logged and presented:

Measured value	MV
Measured value (Integer)	MV2
Setpoint	SP

Object display: GU1OB01



No	Description	Remarks
1	SelectFrame	
2	Header	Object name and description
3.1	Section Text	
3.2	Section Value	Process section
4.1	Class Text	
4.2	Class Value	Object class
5.1	Range MV Max	Range Max of the MV value
5.2	Range MV Min	Range Min of the MV value
6.1	Measure Value Trim Curve	Object measure value
	Setpoint Value Trim Curve	Object setpoint value
7.1	Measured Value Bargraph	
7.2	High Limit 2	Alarm High limit 2
7.3	High Limit 1	Warning High limit 1

No	Description	Remarks
7.4	Low Limit 1	Warning Low limit 1
7.5	Low Limit 2	Alarm Low limit 2
8.1	SP Value	Object setpoint value
8.2	High SP Limit	Upper warning limit setpoint
8.3	Low SP Limit	Lower warning limit setpoint
9	LIMITATIONS for MV	
9.1	MV Text	
9.2	H2 Text	
9.3	H2 Value	High limit 2 value
9.4	H1 Text	
9.5	H1 Value	High limit 1value
9.6	L1 Text	
9.7	L1 Value	Low limit 1value

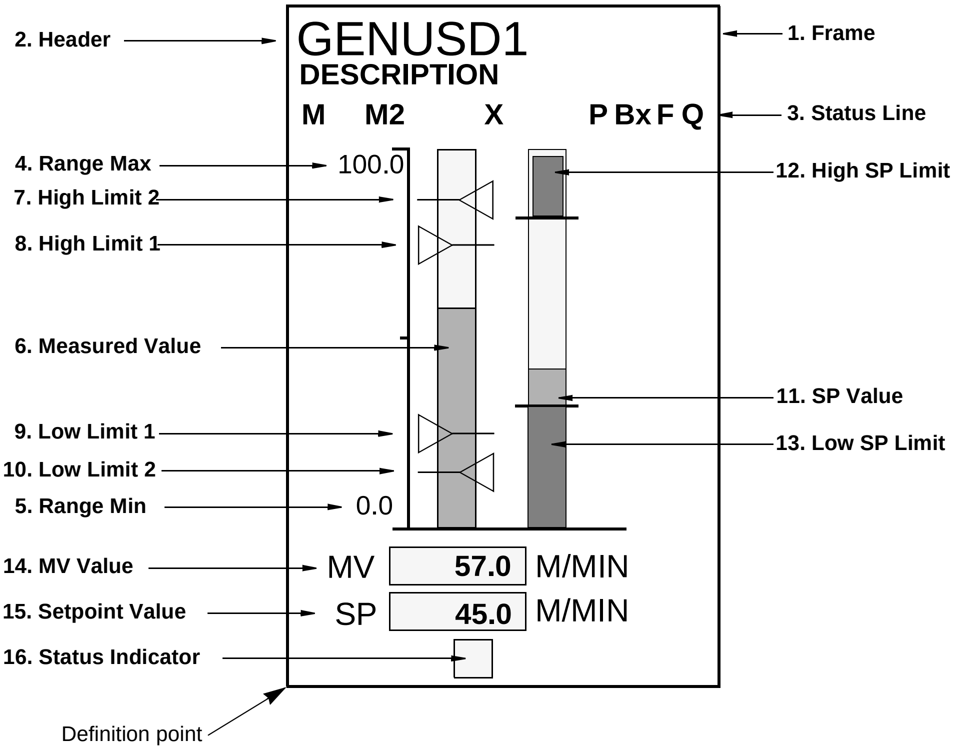
No	Description	Remarks
9.8	L2 Text	
9.9	L2 Value	Low limit 2 value
10	LIMITS for SP	
10.1	SP Text	
10.2	H Text	
10.3	H Value	Setpoint High value
10.4	L Text	
10.5	L Value	Setpoint Low value
11	LIMITS for SP2	
11.1	SP2 Text	
11.2	H Text	
11.3	H Value	Setpoint High 2 value
11.4	L Text	
11.5	L Value	Setpoint Low 2 value
12	ALARMS	
12.1	Printout Blocked	
12.2	Alarm Blocked	
12.3	Alarm Indication	Signal error 1
12.4	User defined text	
13.1	Printout Blocked	
13.2	Alarm Blocked	
13.3	Alarm Indication	Signal error 2
13.4	User defined text	
14.1	Printout Blocked	
14.2	Alarm Blocked	
14.3	Alarm Indication	Alarm 1
14.4	User defined text	
15.1	Printout Blocked	
15.2	Alarm Blocked	
15.3	Alarm Indication	Alarm 2
15.4	User defined text	
16.1	Printout Blocked	
16.2	Alarm Blocked	
16.3	Alarm Indication	Alarm 3
16.4	User defined text	
17.1	Printout Blocked	
17.2	Alarm Blocked	
17.3	Alarm Indication	Alarm 4
17.4	User defined text	
18.1	Printout Blocked	
18.2	Alarm Blocked	
18.3	Alarm Indication	Alarm 5
18.4	User defined text	

No	Description	Remarks
19.1	Printout Blocked	
19.2	Alarm Blocked	
19.3	Alarm Indication	Alarm 6
19.4	User defined text	
20	INTERLOCKS	
20.1	Interlock Indication	Interlock 1
20.2	User defined text	
21.1	Interlock Indication	Interlock 2
21.2	User defined text	
22.1	Interlock Indication	Interlock 3
22.2	User defined text	
23.1	Interlock Indication	Interlock 4
23.2	User defined text	
24.1	Interlock Indication	Interlock 5
24.2	User defined text	
25.1	Interlock Indication	Interlock 6
25.2	User defined text	
26	STATUS & BLOCKING	
26.1	Implemented Indication	
26.2	Implemented text	
27.1	Repeat Fail Block Indication	
27.2	Repeat Fail Block text	
28.1	Event Block Indication	
28.2	Event Block text	
29	Measured Value	
29.1	MV	The MV object value
29.2	MV Value	
29.3	MV Unit	
30	Setpoint Value	The SP object value
30.1	SP	
30.2	SP Value	
30.3	SP Unit	
31	Measured 2 Value	
31.1	MV2 Text	The MV2 object value
31.2	MV2 Value	
31.3	MV2 Unit	
32	Setpoint 2 Value	The SP2 object value
32.1	SP2 Text	
32.2	SP2 Value	
32.3	SP2 Unit	
33.1	I1 Text	
33.2	I1 Indication	Square indication
34.1	I2 Text	

No	Description	Remarks
34.2	I2 Indication	Square indication
35.1	I3 Text	
35.2	I3 Indication	Square indication
36.1	I4 Text	
36.2	I4 Indication	Square indication
37.1	M1 Indication	Operator position indication
37.2	User defined text	
38.1	M2 Indication	Operator position indication
38.2	User defined text	
39.1	M3 Indication	Operator position indication

No	Description	Remarks
39.2	User defined text	
40.1	Man Indication	Manual mode
40.2	Man text	
41.1	Auto Indication	Auto mode
41.2	Auto text	
42.1	Blocked Indication	Blocked mode
42.2	Blocked text	
43.1	Stand By Indication	Stand By mode
43.2	Stand By text	

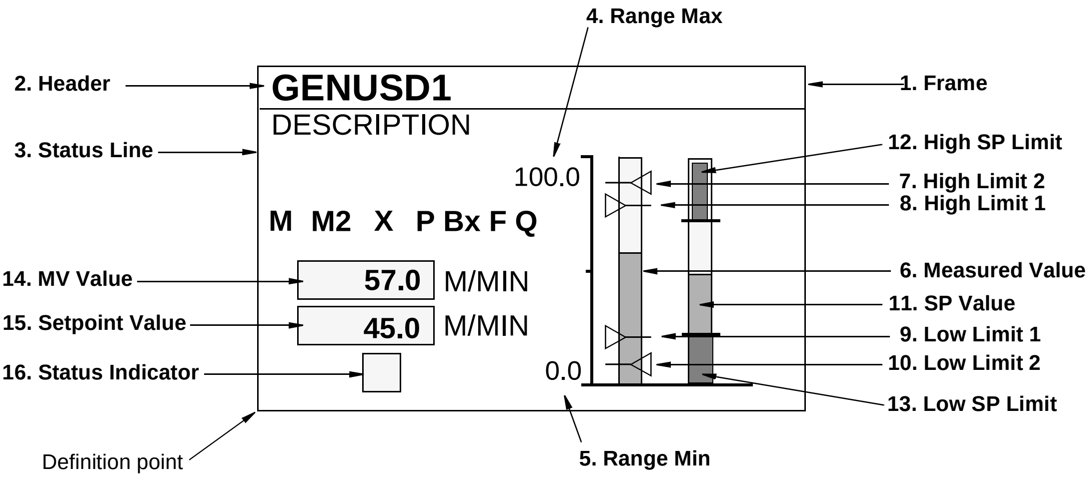
Display Element for Group display: GU1GR01



No	Description	Remarks
1	SelectFrame	
2	Header	Object name and description
3	Status Line	
3.1	Mode	
3.2	Control Point	Operator position
3.3	Interlock Indication	
3.4	Printout Blocked	
3.5	Alarm Blocked	
3.6	Alarm Indication	
3.7	Signal Error	
4	Range Max	Range Max of the MV values
5	Range Min	Range Min of the MV values
6	Measured Value Bargraph	
7	High Limit 2	Alarm High limit 2
8	High Limit 1	Warning High limit 1

No	Description	Remarks
9	Low Limit 1	Warning Low limit 1
10	Low Limit 2	Alarm Low limit 2
11	SP Value	Object setpoint value
12	High SP Limit	Upper warning limit setpoint
13	Low SP Limit	Lower warning limit setpoint
14	Measured Value	The MV object value
14.1	MV	
14.2	MV Value	Measured value
14.3	MV Unit	
15	Setpoint Value	The SP object value
15.1	SP	
15.2	SP Value	Setpoint value
15.3	SP Unit	
16	Status Indication	Square indication

Display Element for Object closeup display: GU1WI01

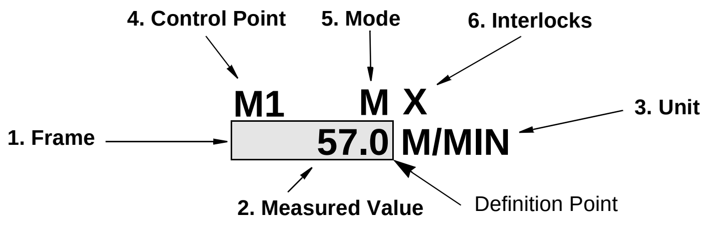


No	Description	Remarks
1	SelectFrame	
2	Header	Object name and description
3	Status Line	
3.1	Mode	
3.2	Control Point	Operator position
3.3	Interlock Indication	
3.4	Printout Blocked	
3.5	Alarm Blocked	
3.6	Alarm Indication	
3.7	Signal Error	
4	Range Max	Range Max of the MV values
5	Range Min	Range Min of the MV values
6	Measured Value Bargraph	
7	High Limit 2	Alarm High limit 2

No	Description	Remarks
8	High Limit 1	Warning High limit 1
9	Low Limit 1	Warning Low limit 1
10	Low Limit 2	Alarm Low limit 2
11	SP Value	Object setpoint value
12	High SP Limit	Upper warning limit setpoint
13	Low SP Limit	Lower warning limit setpoint
14	Measured Value	The MV object value
14.1	MV Value	Measured value
14.2	MV Unit	
15	Setpoint Value	The SP object value
15.2	SP Value	Setpoint value
15.3	SP Unit	
16	Status Indication	Square indication

Display Element for Process display:

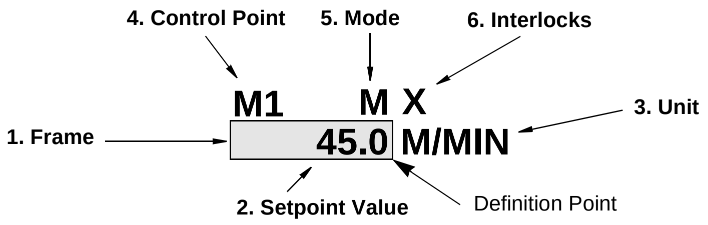
GU1PD01



No	Description	Remarks
1	SelectFrame	
2	Measured Value	
3	Unit	

No	Description	Remarks
4	Control Point	Operator Position
5	Mode	
6	Interlocks	Object interlock

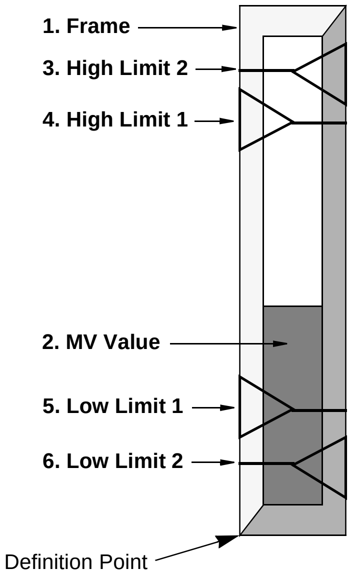
GU1PD02



No	Description	Remarks
1	SelectFrame	
2	Setpoint Value	
3	Unit	

No	Description	Remarks
4	Control Point	Operator Position
5	Mode	
6	Interlocks	Object interlock

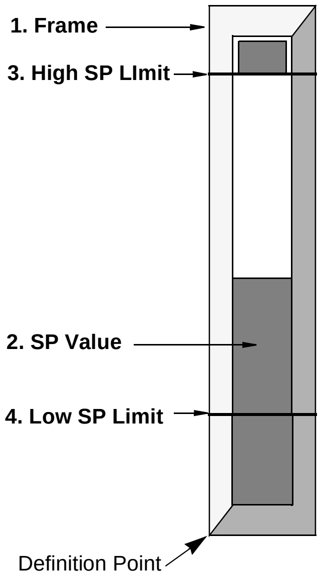
GU1PD51



No	Description	Remarks
1.1	SelectFrame	
1.2	TopLeftEdge	
1.3	BottomRightEdge	
2	Measured Values	

No	Description	Remarks
3	High Limit 2	Alarm High limit 2
4	High Limit 1	Warning High limit 1
5	Low Limit 1	Warning Low limit 1
6	Low Limit 2	Alarm Low limit 2

GU1PD52



No	Description	Remarks
1.1	SelectFrame	
1.2	TopLeftEdge	
1.3	BottomRightEdge	

No	Description	Remarks
2	Setpoint Values	
3	High SP Limit	
4	Low SP Limit	

4.6.2 Dialog

The display screen is supplemented with a keyboard for operator communication with the functional unit/object.

The dialog is built up using both fixed and dynamic keys. The functions available with the dynamic keys are presented in a pattern of rectangles on the lower part of the display screen when the object is selected. The functional unit GENCON has a MIN dialog (Production level) and a MAX dialog (Maintenance level).

The MIN dialog consists of an output dialog with 1 subdialog. The MAX dialog consists of an output dialog with 3 subdialogs.

MIN dialog (No authority key)

Keyboard keys

Man	**Man**	Set to manual mode
Auto	**Auto**	Set to automatic mode
✓	**Acknowledge**	Acknowledge alarm
Object	**Object Display**	Select Object Display
📈	**Object Trend**	Select Object Trend
Dialog	**Previous Level**	Select Top Level dynamic keys
Dialog	**Next Block**	Page between the dynamic key sets
+ ↑	**Increase**	Increase setpoint value with 0.5% Increase setpoint value 2 with 0.5% or at least 1.0
⇧ Shift **+** + ↑		Increase setpoint value with 5% Increase setpoint value 2 with 5% or at least 1.0
↓ −	**Decrease**	Decrease setpoint value with 0.5% Decrease setpoint value 2 with 0.5% or at least -1.0
⇧ Shift **+** ↓ −		Decrease setpoint value with 5% Decrease setpoint value 2 with 5% or at least -1.0

Dynamic keys, Top Level

D1 C1	D2 C2	D3 C3	D4 C4	D5 *Extend…*
D6 SP	D7 SP2	D8	D9	D10 *Keyboard…*

C1	Set to C1 mode
C2	Set to C2 mode
C3	Set to C3 mode
C4	Set to C4 mode
Extend…	Select Dynamic keys: Extend
SP	Check/change setpoint value
SP2	Check/change setpoint2 value
Keyboard…	Select Dynamic keys: Keyboard

Dynamic keys, Keyboard

D1 ↑ Increase	D2 Man	D3 Auto	D4	D5
D6 ↓ Decrease	D7 Acknowledge	D8 Object Display	D9 Object Trend	D10

Increase	Increase setpoint value with 0.5% Increase setpoint value 2 with 0.5% or at least 1.0
Man	Set to manual mode
Auto	Set to automatic mode
Decrease	Decrease setpoint value with 0.5% Decrease setpoint value 2 with 0.5% or at least -1.0
Acknowledge	Acknowledge alarm
Object Display	Select Object Display
Object Trend	Select Object Trend

Dynamic keys, Extend…

D1 M1	D2 M2	D3 M3	D4 Standby	D5 Blocked
D6 C5	D7 C6	D8 C7	D9 C8	D10

M1	Set to M1 mode
M2	Set to M2 mode
M3	Set to M3 mode
Standby	Set to Standby control mode
Blocked	Set to Blocked control mode
C5	Set to C5 mode
C6	Set to C6 mode
C7	Set to C7 mode
C8	Set to C8 mode

MAX dialog (Authority key)

Keyboard keys

Man	**Man**	Set to manual mode
Auto	**Auto**	Set to automatic mode
✓	**Acknowledge**	Acknowledge alarm
Object	**Object Display**	Select Object Display
📈	**Object Trend**	Select Object Trend
Dialog	**Previous Level**	Select Top Level dynamic keys
Dialog	**Next Block**	Page between the dynamic key sets
+ ↑	**Increase**	Increase setpoint value with 0.5% Increase setpoint value 2 with 0.5% or at least 1.0
⇧ Shift **+** + ↑		Increase setpoint value with 5% Increase setpoint value 2 with 5% or at least 1.0
↓ −	**Decrease**	Decrease setpoint value with 0.5% Decrease setpoint value 2 with 0.5% or at least -1.0
⇧ Shift **+** ↓ −		Decrease setpoint value with 5% Decrease setpoint value 2 with 5% or at least -1.0

Dynamic keys, Top Level

D1 C1	D2 C2	D3 C3	D4 C4	D5 *Extend…*
D6 SP	D7 SP2	D8 *Limits…*	D9 *Block…*	D10 *Keyboard…*

C1	Set to C1 mode
C2	Set to C2 mode
C3	Set to C3 mode
C4	Set to C4 mode
Extend…	Select Dynamic keys: Extend
SP	Check/change setpoint value
SP2	Check/change setpoint2 value
Limits…	Select Dynamic keys: Limits
Block…	Select Dynamic keys: Block
Keyboard…	Select Dynamic keys: Keyboard

Dynamic keys, Keyboard

D1 ↑ Increase	D2 Man	D3 Auto	D4	D5
D6 ↓ Decrease	D7 Acknowledge	D8 Object Display	D9 Object Trend	D10

Increase	Increase setpoint value with 0.5% Increase setpoint value 2 with 0.5% or at least 1.0
Man	Set to manual mode
Auto	Set to automatic mode
Decrease	Decrease setpoint value with 0.5% Decrease setpoint value 2 with 0.5% or at least -1.0
Acknowledge	Acknowledge alarm
Object Display	Select Object Display
Object Trend	Select Object Trend

Dynamic keys, Block…

D1 Block Alarm	D2 Block Printout	D3 Block Event	D4	D5
D6 Deblock Alarm	D7 Deblock Printout	D8 Deblock Event	D9	D10

Block Alarm	Block alarm indication
Block Printout	Block event printout
Block Event	Block event indication
Deblock Alarm	Deblock alarm indication
Deblock Printout	Deblock event printout
Deblock Event	Deblock event indication

Dynamic keys, Limits…

D1 H1 80.00	D2 H2 90.00	D3 SP H 70.0	D4 SP2 H 80.00	D5
D6 L1 20.00	D7 L2 10.00	D8 SP L 20.00	D9 SP2 L 30.00	D10

H1	Check/change measured value warning limit H1
H2	Check/change measured value alarm limit H2
SP H	Check/change upper warning limit setpoint
SP2 H	Check/change upper warning limit setpoint2
L1	Check/change measured value warning limit L1
L2	Check/change measured value alarm limit L2
SP L	Check/change lower warning limit setpoint
SP2 L	Check/change lower warning limit setpoint2

Dynamic keys, Extend…

D1 M1	D2 M2	D3 M3	D4 Standby	D5 Blocked
D6 C5	D7 C6	D8 C7	D9 C8	D10

M1	Set to M1 mode
M2	Set to M2 mode
M3	Set to M3 mode
Standby	Set to Standby control mode
Blocked	Set to Blocked control mode
C5	Set to C5 mode
C6	Set to C6 mode
C7	Set to C7 mode
C8	Set to C8 mode

Variation possiblities

A certain variation possibility is available in both dialog by using VALALWD and ORDALWD which are included in the data base element. They can be used to block individual orders and numerical values in the dialogs. See data base element population as described in Section 4.5 Data Base Element GENUSD GENUSD. Note that the blocked dynamic key remains in the dialog. If a blocked key is depressed, an error message is presented on the error message line and the command is not executed. Text on the dynamic function keys can be changed however by editing in a specific static display. When editing, the dialog text for all instances of the same variant (VAR) to which the dialog belongs is changed.

4.6.3 Event Handling

The event handling detects changes in the STATUS word and other status signals.

All of these possible alarms and events are separated into groups.

A reference, an Event Treat pointer, is provided in the data base element for each of these groups. The event handling can locate, via this reference, the place in its own data base which discribes the procedures to be followed in the case of the current event/alarm. The events associated with the different Event Treat pointers are shown in the table below. Here are also shown the standard texts for the default values on the Event Treat pointers and which pointers each event produces if the user wants to define his own event texts.

This is explained in further detail in the manual *AdvaCommand Basic Functions User's Guid*e.

Table 4-1. Event Texts for GENUSD

Events	**Event Treat pointer**	**Property text**		**Event text**	
		Standard text	**Line No in Event Treat**	**Standard text**	**Line No in Event Treat**
Alarm ALQ1 On	AL_TR	Quality 1	1	Alarm	1
Alarm ALQ1 Off	AL_TR	Quality 1	1	Normal	2
Alarm ALQ2 On	AL_TR	Quality 2	2	Alarm	1
Alarm ALQ2 Off	AL_TR	Quality 2	2	Normal	2
Alarm ALF1 On	AL_TR	Fault 1	3	Alarm	1
Alarm ALF1 Off	AL_TR	Fault 1	3	Normal	2
Alarm ALF2 On	AL_TR	Fault 2	4	Alarm	1
Alarm ALF2 Off	AL_TR	Fault 2	4	Normal	2
Alarm ALF3 On	AL_TR	Fault 3	5	Alarm	1
Alarm ALF3 Off	AL_TR	Fault 3	5	Normal	2
Alarm ALF4 On	AL_TR	Fault 4	6	Alarm	1
Alarm ALF4 Off	AL_TR	Fault 4	6	Normal	2
Alarm ALF5 On	AL_TR	Fault 5	7	Alarm	1
Alarm ALF5 Off	AL_TR	Fault 5	7	Normal	2
Alarm ALF6 On	AL_TR	Fault 6	8	Alarm	1
Alarm ALF6 Off	AL_TR	Fault 6	8	Normal	2
Interlock INTLU1 On	INTL_TR	Interl 1	1	On	1
Interlock INTLU1 Off	INTL_TR	Interl 1	1	Off	2
Interlock INTLU2 On	INTL_TR	Interl 2	2	On	1
Interlock INTLU2 Off	INTL_TR	Interl 2	2	Off	2

Table 4-1. Event Texts for GENUSD (Continued)

Events	**Event Treat pointer**	**Property text**		**Event text**	
		Standard text	**Line No in Event Treat**	**Standard text**	**Line No in Event Treat**
Interlock INTLU3 On	INTL_TR	Interl 3	3	On	1
Interlock INTLU3 Off	INTL_TR	Interl 3	3	Off	2
Interlock INTLU4 On	INTL_TR	Interl 4	4	On	1
Interlock INTLU4 Off	INTL_TR	Interl 4	4	Off	2
Interlock INTLU5 On	INTL_TR	Interl 5	5	On	1
Interlock INTLU5 Off	INTL_TR	Interl 5	5	Off	2
Interlock INTLU6 On	INTL_TR	Interl 6	6	On	1
Interlock INTLU6 Off	INTL_TR	Interl 6	6	Off	2
Op. mode M1 M1 On	IND_TR	OperPos1	1	On	1
Op. mode M1 M1 Off	IND_TR	OperPos1	1	Off	2
Op. mode M2 M2 On	IND_TR	OperPos2	2	On	1
Op. mode M2 M2 Off	IND_TR	OperPos2	2	Off	2
Op. mode M3 M3 On	IND_TR	OperPos3	3	On	1
Op. mode M3 M3 Off	IND_TR	OperPos3	3	Off	2
Op. mode Manual On MAN	IND_TR	Manual	5	On	1
Op. mode Manual Off MAN	IND_TR	Manual	5	Off	2
Op. mode Auto On AUTO	IND_TR	Auto	4	On	1
Op. mode Auto Off AUTO	IND_TR	Auto	4	Off	2
Op. mode Blocked On BLK	IND_TR	CtrlBlk	6	On	1
Op. mode Blocked Off BLK	IND_TR	CtrlBlk	6	Off	2
Op. mode Standby On STBY	IND_TR	Standby	7	On	1
Op. mode Standby Off STBY	IND_TR	Standby	7	Off	2
Indication IND1 On	IND_TR	Indic.1	9	On	1
Indication IND1 Off	IND_TR	Indic.1	9	Off	2
Indication IND2 On	IND_TR	Indic.2	10	On	1
Indication IND2 Off	IND_TR	Indic.2	10	Off	2
Indication IND3 On	IND_TR	Indic.3	11	On	1
Indication IND3 Off	IND_TR	Indic.3	11	Off	2

Table 4-1. Event Texts for GENUSD (Continued)

Events	Event Treat pointer	Property text		Event text	
		Standard text	**Line No in Event Treat**	**Standard text**	**Line No in Event Treat**
Indication IND4 On	IND_TR	Indic.4	12	On	1
Indication IND4 Off	IND_TR	Indic.4	12	Off	2

Event treat pointers

The pointers can be allocated other values to permit use of own texts and/or remove certain printouts.

If a pointer is set to 0, this means that all event handling of all events associated with the pointer is stopped.

See the manual *AdvaCommand Basic Functions User Interface Reference Manual* for the results of using other references.

AL_TR:

The default value=2, which means alarm when a signal enters alarm condition and event when a signal leaves alarm condition. The printout format is as shown in Figure 4-2

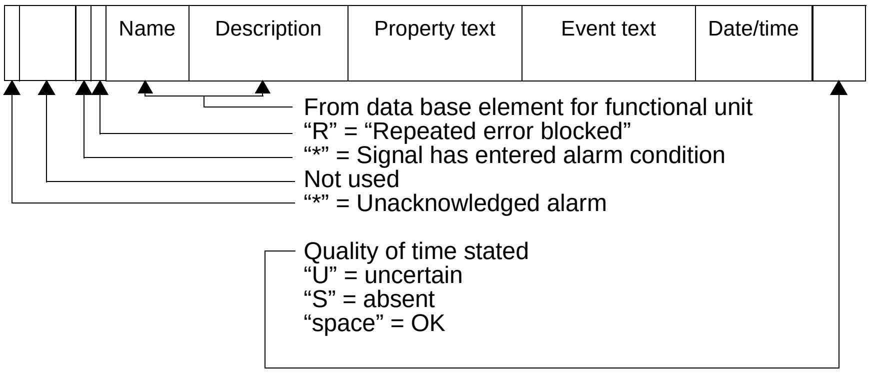

Name
Description
Property text
Event text
Date/time
From data base element for functional unit
“R” = “Repeated error blocked”
“*” = Signal has entered alarm condition
Not used
“*” = Unacknowledged alarm
Quality of time stated
“U” = uncertain
“S” = absent
“space” = OK

Figure 4-2. Format of printout in alarm and event list

```
*    *  M353.12        High Pressure Pump          Quality1      Alarm        94-11-17 12:38:03:990
```

Figure 4-3. Printout from an AI-error

INTL_TR:

Default value = 1 which means events when an interlock is coming and when it dissapers. The format of the printout is the same as for AL_TR.

IND_TR:

Default value = 1 which means event when an indication changes value. The format of the printout is the same as for AL_TR.

Alarm handling

One of the groups described in the section about Event handling can be handled as an alarm. The corresponding Event Treat pointer is designated AL_TR.

The following signals are included:

- ALQ1 and ALQ2 - signal error.
- ALF1-ALF6 - other errors.

Blocking function

Alarm and event handling can be blocked from

- The dialog
- The data base element (configuration parameters)
- The control program

Blocking from the dialog sets one or several of the flags AL_BLK, EV_BLK and PR_BLK in the data base element. I.e. displays, lists and printouts can be blocked with respect to alarms and events included in the groups AL_TR, INTL_TR and IND_TR.

Blocking from the dialog is indicated in the displays with a B or with a square in front of an explanatory text.

Blocking from the data base element can be performed by setting a zero on the corresponding EVENT TREAT pointer. No indiction of this is given on the displays.

Default values can also be given to the flags AL_BLK, EV_BLK and PR_BLK. These will however be written over by the dialog.

Blocking in this way is indicated in the displays in the same way as blocking from the dialog.

Blocking from the control program is made in a conven-tional way with the help of logic elements, switches etc. If indication in displays is wished the blocking control signal should also be connected to data base element connection AUTO_BLK.

4.6.4 Group Alarm

It is possible to connect the functional unit GENUSD to the group alarm function. This function makes it possible to gather alarms and events from related process signals and objects into Alarm Groups. These groups are then treated as objects.

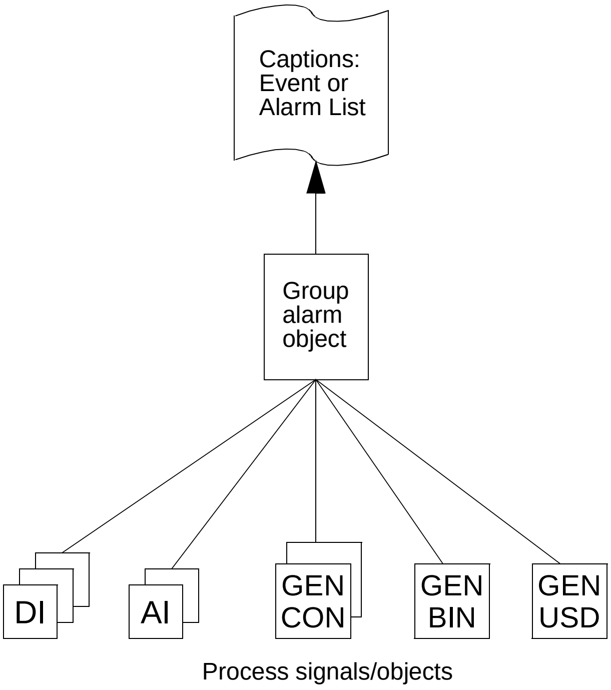


Figure 4-4. Group Alarm

The group alarm function consists of four parts as follows:

- Grouping of process alarms and events.
- Blocking of groups
- Automatic acknowledgement
- External alarm outputs

For a more detailed description of the group alarm function, reference is made to the manual *AdvaCommand Basic Functions User’s Guide*.

4.7 Application Example

As mentioned above, the PC program is user defined. This means that the user is responsible for both the control-technique and the connection to the data base.

An example of how the different properties in the data base element can be utilized and how a simple control function can be implemented is shown in Figure 4-4. Note in particular that the connection to the data base element is either direct or via the PC elements GENUSD-O and GENUSD-I.

4.7.1 PC Program Example

Figure 4-5 and Figure 4-6 shows a simple motor control unit built up with the functional unit GENUSD and standard Advant Controller 410/450 library functions.

The motor is always in the MAN control mode and is controlled from a central operator’s console.

Of the two operation conditions RUN_COND1 requires immediate restart whereas RUN_COND2 requires restart only if the condition persists longer than 5 secs. There is also a start condition which must be satisfied for it to be possible to start the motor. Alarm checks are performed on three signal errors and one feedback error. When the GENUSD data base element is populated, ORDALWD should be set to H’0180 and VALAWD to H’0000 to block orders not used in the PC program.

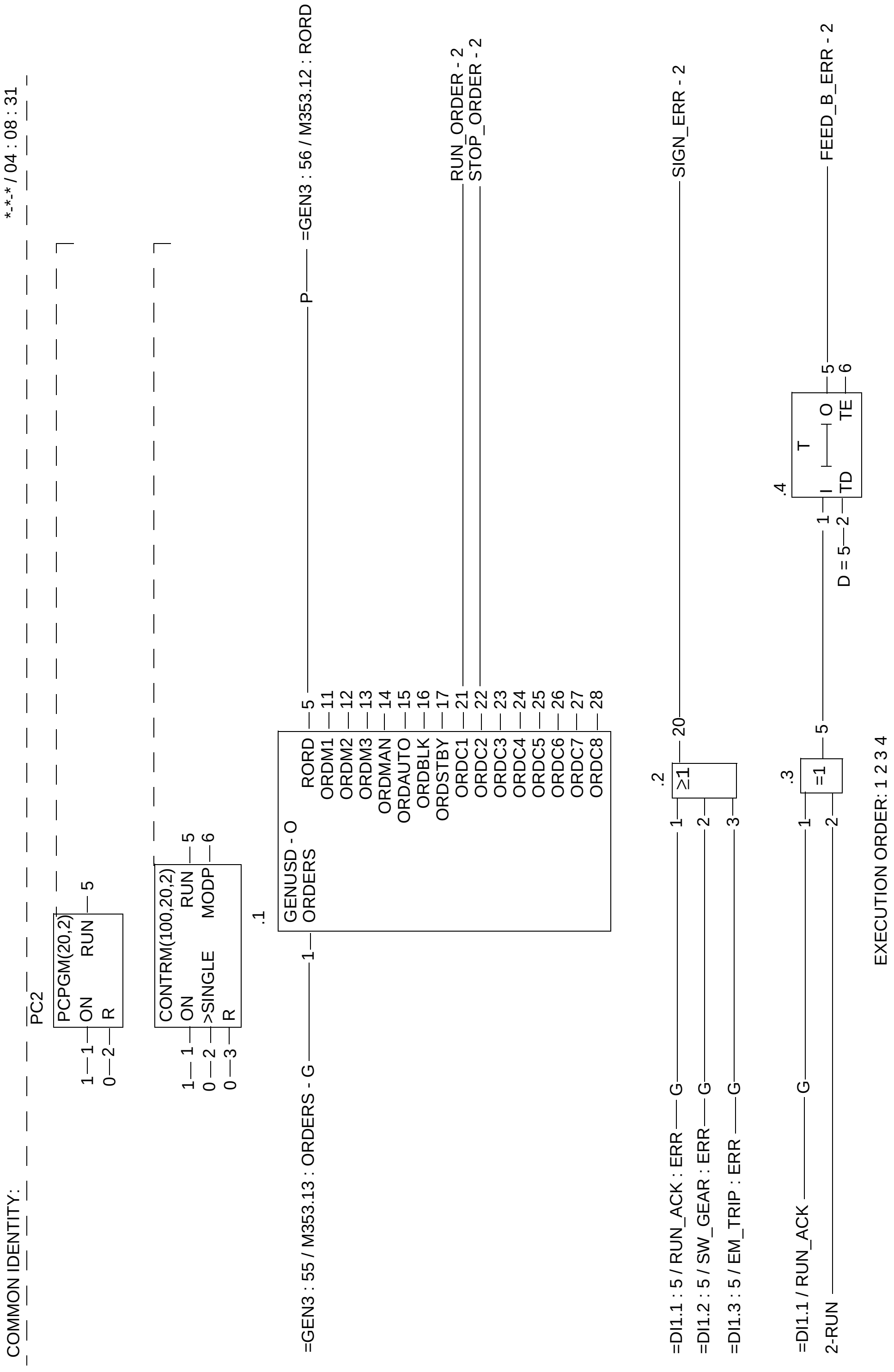


Figure 4-5. PC program example

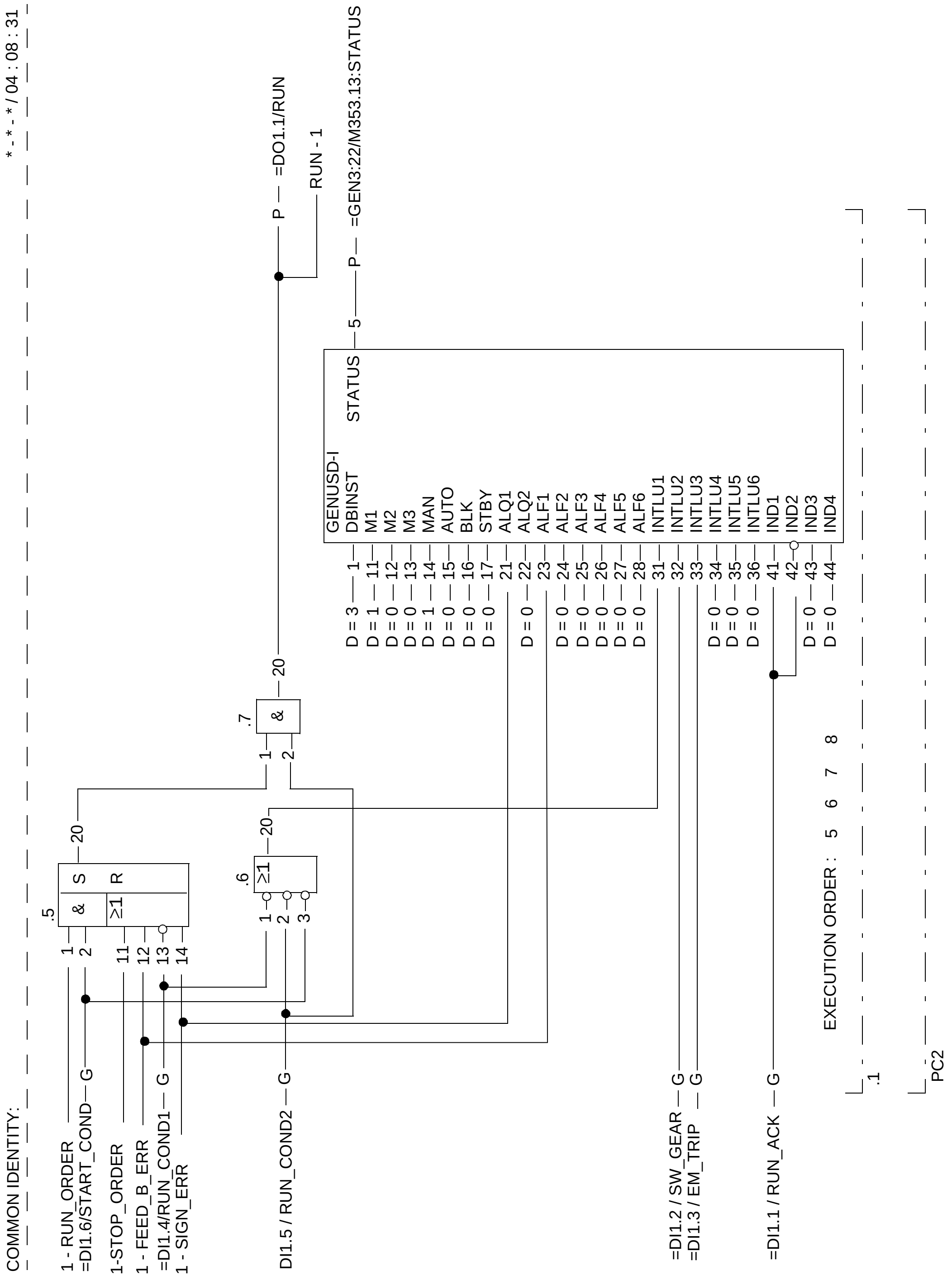


Figure 4-6. PC program example

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